LIBRARY

TALLAHASSEE

FLORIDA

NO. 331.83

Harap

cop. 2

THE EDUCATION OF THE CONSUMER

THE MACMILLAN COMPANY
NEW YORK · BOSTON · CHICAGO · DALLAS
ATLANTA · SAN FRANCISCO

MACMILLAN & CO., LIMITED
LONDON · BOMBAY · CALCUTTA
MELBOURNE

THE MACMILLAN CO. OF CANADA, LTD.
TORONTO

THE EDUCATION OF THE CONSUMER

A Study in Curriculum Material

BY

HENRY HARAP, Ph.D.

CLEVELAND SCHOOL OF EDUCATION

LIBRARY
FLORIDA STATE COLLEGE FOR WOMEN
TALLAHASSEE, FLORIDA

New York

THE MACMILLAN COMPANY

1924

All rights reserved

PRINTED IN THE UNITED STATES OF AMERICA

Soc
HB
801
H3

331.83
Hatap
c.2

COPYRIGHT, 1924,
BY THE MACMILLAN COMPANY.

Set up and electrotyped. Published October, 1924.

ROBERT MANNING
STROZIER LIBRARY

SEP 14 1987

Tallahassee, Florida

Norwood Press
J. S. Cushing Co. — Berwick & Smith Co.
Norwood, Mass., U.S.A.

To

THE STAFF OF THE ECONOMICS DIVISION OF
THE NEW YORK PUBLIC LIBRARY

WHO FOR OVER TWO YEARS RESPONDED TO THE
DAILY DEMANDS OF THIS STUDY WITH
EFFICIENCY AND PATIENCE

119

PREFACE

THE specific aim of this study is to help ascertain the objectives of education for American economic life with special reference to consumption. In its broadest terms it analyzes for educational guidance the elements of an effective relation between man and his economic environment as it expresses itself in the consumption of food, shelter, fuel, and clothing. It does not include, as would a complete analysis of the aims of economic life, a consideration of vocational life, the social phases of production, and industrial progress.

Since this study grew out of an attempt to make a curriculum for effective living, it is frankly intended to furnish a method and some working material for those who are engaged in constructing curricula. It is intended that the material in this book shall be organized by the psychologist and administrator for practical use in educational institutions after a plan to be elaborated later.

The material is organized to make it possible for teachers and administrators to select such units of content as are adapted to a particular age, sex, and local condition, or to a special scheme of relative values. The recommendations are presented as objectives, making it possible to introduce them into the school program as projects.

Some teachers and administrators may choose to use the material herein as a source in connection with such studies as civics, geography, economics, arithmetic, and domestic science. The bulk of the book consists of evidence of the present economic habits of the people of our nation as well as of an evaluation of these habits in the light of reliable standards of living.

No new course of study is proposed nor is this material intended especially to feed any old or recent course of study. This study aims to propose objectives of school activity, to give direction to some of the school studies. It is partial to no special theory of

education. The inquiry is concerned primarily with the conditions of economic life and their bearing on the curriculum.

It is not expected that the conclusions in this work be utilized without critical evaluation. For example, when it is proposed that the schools of the nation undertake to reduce the consumption of meat, it is expected that the reader will study the table showing the per capita consumption of meat as compared with other countries, the per capita consumption of meat as compared with scientifically determined dietary standards, and the cost of meat as compared with foods of high nutritive value. In spite of the evidence here, he may be satisfied by his own evidence that in the community in which he is located there is a need to increase the consumption of meat.

Again, when it is suggested that the automobile be made a basis of school content because every second white family owns an automobile, it is obvious that this suggestion does not apply to certain sections of New York City, for example, in which it would be difficult to find an automobile for every thousand families. It does, however, apply very definitely to certain farming communities in which a Ford car will probably be found to every family. The purpose of the generalization on the use of the automobile is to focus the attention of the curriculum maker in any locality upon an economic condition which is very likely, but not absolutely certain, to apply there.

Because some critics who have read this book in manuscript deplore the lack of attention to the cultural and spiritual elements of home life, the author wishes to acknowledge the importance of these elements and to explain that they were beyond the scope of the present inquiry. However, he feels constrained to point out the intimate relation between the familiar daily habits of living and an abundant life. A more complex system of habit formation goes on herein than is superficially evident, involving the fusion of many elements of knowledge and skill.

For the general reader, *The Education of the Consumer* contains much practical advice on the purchase and use of every household commodity from the point of view of economy, durability, health,

comfort, and beauty. For every commodity, it contains suggestions pertaining to selection, purchase, storage, care, and repair. Numerous specific defects in habits of consumption are pointed out and the remedies are suggested. Thus, it is a manual for the consumer, a reference book for the home. The layman may prefer to skip the first chapter, which is addressed especially to teachers.

The wide range of interests to which this work appeals is not accidental, man's experience as a consumer being a large segment of the whole of life. The material in the book cuts across the fields of economics, social problems, arithmetic, science, the household and industrial arts, and health.

This study was conducted under the supervision of Dr. William H. Kilpatrick, Dr. Frederick G. Bonser, Dr. Milo B. Hillegas, and Dr. Harold Rugg of Teachers College, Columbia University, to whom the author is deeply grateful for their guidance and encouragement. Dr. David Snedden made valuable suggestions. Many persons were consulted on the particulars of this study and rendered material assistance. Many members of the great fraternity of scholars to whom one may always turn for advice have personally and through their works contributed to this study. To Dr. Kilpatrick, in particular, the author wishes to express his appreciation for kind help from the beginning to the end of this study.

HENRY HARAP.

109
14
91
61
152

CONTENTS

CHAPTER I

A STUDY IN CURRICULUM MATERIAL

PAGE

A Proposed Method of Curriculum-Making 1

Curriculum-Making a Coöperative Task 2

The Method of This Study 4

I. The Problem Stated 4

II. Data on Present Habits of Living 5

III. Data on Standards of Consumption 8

IV. Comparison of Actual Conditions with Standards . . . 9

V. The Educational Objectives 10

Difference between This and Other Curriculum Studies . . 11

I. Does Not Begin with a Formal Subject 11

II. Not a Direct Survey of the Actual Needs of the Learners . . 12

III. Compares Actual with Standard Conditions 13

Use of the Results of This Study 13

I. By the Curriculum-Maker 13

II. As Material in Social Science and Household Economy . . 14

III. By Teachers of the Special Subjects 15

The Task Outlined 17

CHAPTER II

FOOD CONSUMPTION

Its Place in Economic Life 18

The Chief Foods of the Nation 18

Food Selection Based upon Quantity Consumed 19

Food Selection Based upon Amount of Money Spent for Chief Food Commodities 22

Food Selection to Meet the Daily Energy Requirement . . 24

Selection of Food to Furnish the Requirements of Proteins, Fats, and Mineral Salts 26

PAGE

The Consumption of Milk and Dairy Products 28
The Consumption of Meat 32
The Consumption of Vegetables 36
The Composition of Fruits 40
The Consumption of Cereals 42
The Consumption of Coffee, Tea, and Cocoa 44
Relation of Selection to Cost of Food 45

CHAPTER III

FOOD CONSUMPTION (Continued)

Buying Food in Large Quantities 50
Buying Food in Packages 51
Making Purchasing Adjustments to Seasonal and Price Changes 55
Buying for Cash or on Credit 55
Constructive Marketing Schemes 56
Buying Superstitions 59
Storing and Preserving Food 60
The Preparation of Food 62
Food for the Sick 65
Waste in the Use of Food 66
Food Measurement and Calculation 68
Use of Fuel in Cooking 72
Miscellaneous Skills Connected with Food Consumption . . 74
I. Food Serving and Table Manners 74
II. Household Appliances Connected with Food Consumption . . 75

CHAPTER IV

HOUSING

The American Dwelling 77
The Housing Conditions of the Nation as Revealed by Surveys 79
Housing Standards 81
Home Ownership 83
I. Home Ownership and Living Conditions 86
II. Home Ownership and Building Tendencies 88

PAGE

III. Home Ownership and Labor Mobility 88
IV. Significant Agencies for Extending Home Ownership . . 89
V. Home Ownership and Government Aid 90
VI. Industrial Housing 91
VII. Housing and Financing Companies 92
VIII. Coöperative Housing 92
TENEMENTS AND EDUCATION 95
OVERCROWDING 98
RENT AND EDUCATION 101
I. Rent and Income 101
II. What Is a Fair Rental 103
III. Rent and Taxes 105
IV. Rent and the Budget 106
VENTILATION 107
HOUSING SHORTAGE 109

CHAPTER V

HOUSEHOLD MATERIALS

THE CHIEF HOUSEHOLD COMMODITIES 112
BUILDING MATERIALS 114
I. Lumber 117
II. Brick, Cement, and Glass 118
FURNITURE 122
I. The Chief Furniture Woods 122
II. The Quality of Furniture 125
PAINT AND VARNISH 129
I. Ready-mixed Paint 132
II. Varnish 132
III. Paints and Lighting 133
METAL PRODUCTS, TOOLS, AND HARDWARE 135
I. Brass, Bronze, and Copper Products 136
PAPER PRODUCTS 137
LEATHER GOODS 140
FLOOR COVERINGS 142
CLEANSING AND POLISHING PREPARATIONS 145
ADHESIVE MATERIALS 151

PAGE
Brushes and Brooms 152
Phonographs 154
Automobiles 157

CHAPTER VI

HOUSEHOLD SKILLS

Introduction 160
How Household Skills Were Determined 161
Household Skills Discovered in Surveys 162
Skills Suggested by Items of Building Construction . . . 164
Skills Suggested by the Chief Commodities Consumed in the Home 165
The Combined Factors Which Determine What Skills Shall Be Recommended 168
Carpentry Skills 171
Skills Related to the Maintenance of a House 173
I. Painting and Varnishing 173
II. Plastering and Concreting 174
III. Glazing 175
IV. Plumbing 175
Housecleaning Skills 177
Decorative Skills 179
Gardening Skills 180
Miscellaneous Skills 182
Guarding against Hazards 183
Measurement and Calculation Connected with the Purchase and Use of Household Articles 184

CHAPTER VII

FUEL CONSUMPTION

Introduction 194
The Chief Household Fuels 194
Comparative Importance of the Chief Fuels 197

PAGE

The Fuels of Our Nation as Shown in Surveys 198
The Fuel Problem 199
Lighting 201
I. Materials of Illumination 202
II. Lighting Apparatus 203
III. Color of Walls 204
IV. Relative Cost of Several Illuminants 205
Heating 206
Relative Costs of Fuels 208
Electrical Materials and Supplies 212
Safety in the Use of Fuels 213
Fuel Skills 215
Fuel Measurement and Calculation 220

CHAPTER VIII

CONSUMPTION OF CLOTHING

Introduction 223
Social Significance of Clothing 224
I. Fashions in Clothing 225
Comparison of Actual with Standard Consumption of Clothing by the People of the United States 228
I. Actual Consumption 228
II. Clothing of the People as Revealed in Surveys 229
III. Some Standards of Clothing Consumption 231
IV. Comparison of Actual with Standard Consumption of Clothing . 231
Clothing and the Budget 234
Qualitative Standards of Clothing 238
I. Durability 238
II. Hygienic Properties 239
III. Laundering Properties 240
IV. Beauty 241
The Consumption of the Chief Clothing Fabrics . . . 243
I. Cotton as a Clothing Fabric 245
II. The Use of Wool in Clothing 247
III. Silk in Clothing 251
IV. Linen Goods in Clothing 254
V. The Use of Fur in Clothing 257
VI. Rubberized Fabrics in Clothing 259

CHAPTER IX

CONSUMPTION OF CLOTHING (Continued)

PAGE

Women's Clothing 261
The Consumption of Men's Clothing 263
The Consumption of Shoes 265
The Consumption of Hosiery 269
The Consumption of Hats 272
Underwear Consumption 274
Consumption of Men's Furnishing Goods 276
The Consumption of Textile Furnishings 277
The Construction and Care of Clothing 281
Clothing Measurement and Calculation 284

CHAPTER X

OBJECTIVES ARRANGED BY SUBJECTS

HOUSEHOLD ARTS 287
I. Selection of Food 287
II. Consumption of Dairy Products and Meat 288
III. The Consumption of Vegetables, Fruits, etc. 289
IV. Relation between Selection and Cost of Food 291
V. Purchasing Food 291
VI. Storage and Preparation of Food 293
VII. Waste of Food 294
VIII. Housing Conditions 295
IX. Purchase of Household Articles . . . . . 29[illegible]
X. Clothing Standards 297
XI. The Chief Clothing Fabrics . . . . . 29[illegible]
XII. The Chief Articles of Clothing 300
XIII. Textile Furnishings . . . . . 30[illegible]
XIV. Construction and Care of Clothing . . . . . 30[illegible]
INDUSTRIAL ARTS 304
I. Building Materials and Furniture 304
II. Paint, Varnish, and Metal Products 305
III. Miscellaneous Household Articles 307
IV. Carpentry Skills, etc. 308
V. Care of a House 309
VI. Miscellaneous Household Skills 310
VII. Fuels, Lighting, and Heating 311
VIII. Fuel Skills 313

PAGE

SOCIAL STUDIES — CONSUMERS' PROBLEMS 314
I. Consumption of Food 314
II. Housing, Home Ownership, and Rent 316
III. Furniture, Fuels, etc. 319
IV. Clothing 319

CONSUMER'S ARITHMETIC 320
I. Food Measurement and Calculation 320
II. Household Measurement and Calculation 322
III. Fuel Measurement and Calculation 323
IV. Clothing Measurement and Calculation 324

SCIENCE FOR THE CONSUMER 324
I. Food 324
II. Housing, Building Materials, etc. 325
III. Cleansing and Polishing Preparations 326
IV. Miscellaneous Household Articles 327
V. Household Skills 327
VI. Fuels, Lighting, and Heating 329
VII. Fuel Skills 330
VIII. Clothing 330

THE CONSUMER'S HEALTH 331
I. Food Consumption 331
II. Housing 332
III. Clothing 333

HOUSEHOLD SAFETY 334

BIBLIOGRAPHY 335
INDEX 355

TABLES

NUMBER		PAGE
1.	Consumption of Chief Food Commodities Based on Weight	21
2.	Consumption of Chief Food Commodities Based on Amount of Money Spent	23
3.	Relation between Standard and Actual Consumption of Foods in Caloric Units	25
4.	Standard and Actual Consumption of the Chief Nutrients in Grams per Man per Day	27
5.	Household Consumption of Milk	29
6.	Utilization of Milk in 1919	30
7.	Per Capita Consumption of Butter and Margarine	30
8.	Per Capita Consumption of Meat in Europe and America	32
9.	Per Capita Consumption of Meat, 1919	33
10.	Relative Wholesale Cost of Cuts of Beef	34
11.	Quantity and Cost of Several Foods Yielding One Ounce of Protein	35
12.	Comparative per Capita Consumption of Fish	35
13.	Relation of Quantity of Vegetables Consumed to Food Value and Price	39
14.	Relation of Quantity of Fruits Consumed to Food Value	41
15.	Relation of Quantity of Grains Consumed to Food Value and Price	44
16.	Relation between the Amount Consumed of the Chief Food Commodities and Their Cost	46
17.	Relation between Amount Expended and Combined Food Value	48
18.	Wholesale and Retail Price of Four Foods, 1921	51
19.	Differences in Retail Price between Food Bought in Package and in Bulk, July, 1917	52
20.	Items of Cost of Producing Canned Goods, 1917	53
21.	Distribution of Problems Relating to Food	68
22.	Relative Cost of Fuel Materials in Cooking a Dinner	73
23.	Summary of Housing Surveys	80
24.	Summary of Housing Standards	82

NUMBER		PAGE
25.	Average Cost per Family of Dwellings in 196 Cities in 1920	84
26.	Percentage of Families Owning Houses They Occupy	86
27.	Relation of House Congestion to Rented Homes	87
28.	Kind of Dwellings Constructed in 1920 in 196 Cities	96
29.	Per Cent of Families Overcrowded	98
30.	Difference in Rent on Various Dwellings	100
31.	Some Standard Allotments for Rent	102
32.	Revenues and Expenses in Terms of Percentage on Investment	104
33.	Relation of Rent to Infant Mortality	106
34.	Consumption of Chief Household Articles in Order of Money Value	112
35.	Cost of an Imaginary Composite Building	114
36.	Relative Importance of Materials in Construction of a Frame House	116
37.	Lumber Used Chiefly in Building in 1920	116
38.	Production of Brick and Clay Products, 1920	119
39.	Consumption of Some Building Materials	119
40.	Relative Importance of Glass Products	121
41.	Relation of Prices Reported in Bureau of Labor Study with Medium Prices Advertised in New York Globe during the Same Period	126
42.	Durability of 16 Chief Woods Used by 202 Furniture Manufacturers in 1920, in Order of Quantity Consumed	127
43.	Durability of Wood Used by 202 American Furniture Manufacturers in 1920	127
44.	Total Average Expenditure for Furniture and House Furnishings of 6,180 Northern Families	128
45.	Consumption of Chief Paint and Varnish Commodities, 1917	130
46.	Reflection Value of Some White Pigments	133
47.	Reflection Values of Common Interior Colors	134
48.	Quantity of Certain Iron and Steel Products, 1917	135
49.	Paper Products	138
50.	Specifications for Papers	139
51.	Tearing Strength of Various Papers	139
52.	Relative Cost of Carpets and Rugs in Order of Cheapness	143
53.	Floor Coverings Produced in 1919	144
54.	The Chief Raw Materials of the Soap Industry, 1919	146

NUMBER		PAGE
55.	Chief Raw Materials of Soap Manufacture (in pounds)	147
56.	Purchase of Phonographs by Years	154
57.	People per Car Used in the United States each Year	157
58.	Relative Importance of Skills in 60 Homes	163
59.	Household Conditions on 10,000 Farms	163
60.	Distribution of Labor Cost on Buildings	165
61.	Household Commodities Skill in the Use of Which Is a Factor of Economy	166
62.	Household Commodities Skill in the Use of Which Is a Factor of Durability	167
63.	Household Commodities Skill in the Use of Which Is a Factor of Health, Cleanliness, and Comfort	168
64.	Factors Which Determined the Selection of Skills	169
65.	Rank of the Chief Skills Based on Three Factors	170
66.	Arithmetic of Household Materials Used by 4068 Persons as Compared with the Relative Importance of These Materials	185
67.	Calculations Involved in the Purchase and Use of Household Materials	187
68.	Relative Importance of Units Used in Household Calculation	188
69.	Some Arithmetical Processes Employed by 4068 Persons with Special Reference to Units of Household Articles	189
70.	Firewood Used on Farms	195
71.	Firewood Used in the United States in 1908	196
72.	Relative Consumption of Fuels in 1920 in Energy Value	197
73.	Relative Consumption of Fuels in 92 Cities	198
74.	Petroleum Consumption, 1920	200
75.	Relative Brightness of Common Illuminants	202
76.	Relative Cost of Household Illuminants	205
77.	Relative Cost of Continuous Heating of an Average Room	208
78.	Comparative Cost of Fuels in the State of Washington	208
79.	Comparative Value of Fuels Used for Cooking in Washington, Prices, December, 1916	209
80.	Efficiencies of Cooking Equipment	209
81.	Relative Cost of Fuels for Cooking	210
82.	Relative Fuel Cost of Supplying Hot Water	210
83.	Per Capita Losses from Fires, 1913	213
84.	Important Causes of Fire	214
85.	Heat Loss Due to Soot Deposit	217

NUMBER		PAGE
86.	Chief Causes of Heat Loss	217
87.	Clothing Consumed in the United States, 1919	229
88.	Quantity and Cost of Clothing Bought by a Workingman's Family (Dec. 1918)	230
89.	Clothing Standards	232
90.	Family Expenditures for Clothing	237
91.	Amount Actually Spent for Clothing as Shown in Surveys	237
92.	Raw Materials Used in Textile Industries, 1919	244
93.	Products of Textile Industries, 1919	244
94.	Woolen and Worsted Goods, 1919	248
95.	Relative Quality of Woolen and Worsted Goods as Shown by the Fibers Used in Their Manufacture	249
96.	Estimate of Average Annual Production of Some Furs in North America (1907–09) and Their Relative Cost	258
97.	Consumption of Women's Clothes Compared with Standard	262
98.	Consumption of Men's Clothing Compared with Standard	263
99.	Quality of Suits Sold by 128 Stores in 1919	264
100.	Shoe-Leather Production, 1919	266
101.	Chief Sole Leathers Produced in the United States in 1919	268
102.	Production of Hosiery, 1919	270
103.	The Production of Hats — From the 1921 Census Report	272
104.	Average Expenditure for Textile Furnishings by 6180 Northern Families	278
105.	The Production of Textile Furnishings in the United States (1921)	279
106.	Occurrence of Fractions in Clothing Calculations	285

THE EDUCATION OF THE CONSUMER

THE EDUCATION OF THE CONSUMER

CHAPTER I

A STUDY IN CURRICULUM MATERIAL

THE data on the conditions of economic life are at the disposal of the legislator, the social worker, the economist, the sociologist, and the student of education. Let other workers do what they will, the student of education must set these conditions before him. Granting to other agencies the functions which they can perform best, he must assume with them his share of the responsibility for the improvement of economic life. The purpose of this study, then, is to ascertain the objectives of education for American economic life with special reference to the consumption of food, shelter, fuel, and clothing.

It is clear that the investigation presupposes a reorganization of the curriculum to prepare the people of our nation to live economic life effectively. Although the product of this investigation does not limit its application to any fixed form of curriculum construction, the writer did have such a plan in mind. This plan will be discussed briefly and then can be dismissed from the main task of this book.

A PROPOSED METHOD OF CURRICULUM-MAKING

There are five factors which condition the curriculum:

1. The fundamental elements of effective social life.
2. The nature of the learner.
3. The laws of learning.
4. The nature of the teacher.
5. The attitude, resources, and limitations of the community.

Theoretically, then, the problem of curriculum making is to select and organize ingeniously each unit of school activity to meet the demands of these five factors. Obviously, a program of school activities can be designed only after a great amount of thorough research, careful revision, and scientific organization. It must be based upon a study of the fundamental needs of life. It must conform to the nature of the learner. It must be organized to obtain the best advantages of the laws of the learning process. It must be selected and organized on the assumption that it is to be administered by a teacher. It must be adapted to the educational resources and limitations of the community.

Curriculum-Making a Coöperative Task

American universities have developed experts in the departments which are concerned with these five factors who are competent, coöperatively, to assemble and to organize a scientific curriculum. There are now in the field a number of specialists who are skilled in the scientific determination of curriculum objectives and who have made considerable headway in furnishing the sociological basis of the school activities. The psychologists and experimental schools have made progress in discovering the nature of the child as it relates to school life. The psychologists, too, have refined the laws of the learning process and have begun to organize school activities scientifically for effective learning. Administrators are studying the equipment of the teacher and the conditions of the community which affect the educational process. These three groups of specialists — the educational sociologists, the psychologists, and the administrators — are prepared to formulate a curriculum in accordance with one or more of the fundamental demands of the educational process.

In fact these three groups of specialists are now engaged in the very task of remaking curricula. Each group, however, is doing this independently, employing its specially developed procedure and making its own peculiar emphasis. Each group, consequently,

is producing textbooks and courses of study perfect only in that phase in which its members are specialists.

The psychologists have written textbooks which are remarkable achievements in the organization of content for maximum learning, but have failed to meet the very fundamental demands of social life. The sociologists have made noteworthy quantitative studies of social needs, have selected the content with scientific care, but have neglected to organize the content according to the best discoveries of the psychologist, the experimental school, and the administrator. Experimental schools have been very faithful in adapting the curriculum to the child's true nature, but they have failed to take into account the fundamental needs of life as ascertained by the sociologist, and also to organize the school activities for maximum learning. Obviously what we need at this point is a pooling of the gifts of these experts in the common task of curriculum making.

The reconstruction of the curriculum should be the result of the coöperative effort of the experts in the several departments of educational study which affect the curriculum. The first selection of the content of the school activities should be made by those who have developed the special technique of ascertaining the fundamental needs of society. Having finished their work, they should pass their data on to the expert on the nature of the child, whose responsibility it will be to make a further selection and a rough organization of the material in accordance with his knowledge and technique. These roughly selected and organized data should be passed on to the expert on the learning process, whose duty it will be to organize the content for most effective learning. The tentative curriculum should then go to the administrator, who will make the adaptations which conform to the nature of the teacher and to the resources and limitations of the community. After the material has passed through the hands of all these experts, they should then assemble in conference with the original and revised material before them for the purpose of balancing the fundamental demands in an attempt to integrate the content in accordance with the five important educational

factors. It is conceivable that one genius can embody the fivefold skill required for scientific curriculum-making, but it is prudent to call on specialists until such a genius can be discovered.

The product is a curriculum with a balanced organization of the fundamentals of education. It is not a fixed instrument. It is periodically revised. It is comprehensive, allowing for liberal selection of content. It is not a complete curriculum but a minimum curriculum. The community, the teacher, and the child determine the complete curriculum in any one school unit.

The Method of This Study

I. THE PROBLEM STATED

In terms of the method just proposed, the problem of this book is the first step in the process of curriculum reconstruction. It is the purpose of this study to discover the objectives of education for American economic life with special reference to the consumption of food, shelter, fuel, and clothing. The conclusions of this inquiry will be termed *educational objectives* because they are the habits, skills, knowledge, or attitudes which should be achieved by educational activity.

It will be necessary, first, to know what the present economic habits of the people of our nation actually are; second, to compare these habits with standards of good living which have scientific support, such as the daily food requirements, or with standards which are widely accepted although they have not yet been scientifically demonstrated, such as the housing standard worked out by our government during the world war. This procedure will result in conclusions recommending that certain of our habits are utterly bad and should be discontinued; that others are poor and should be improved; and that there are some good habits thus far neglected which should be developed. These conclusions become the ends or objectives of economic life to be attained by the educational process.

II. DATA ON PRESENT HABITS OF LIVING

It is a postulate of this study that, all things being equal, it is sounder to frame school policy on the best obtainable evidence than on opinion. It is assumed also that the process of gathering data to form the basis of curriculum change will continue and that inadequate evidence will be replaced as rapidly as new and better evidence can be discovered. We may, therefore, anticipate that the data will be of varying degree of validity and scope, but that they will be the best obtainable evidence of present practice checked up by the best data on standard practice.

With respect to the present habits of the people, the method here is to gather all the evidence which shows what the people actually do in the process of consuming food, clothing, shelter, and fuel. It is obvious that any attempt to make a direct study of the economic habits of a large group of people would be a tremendous task requiring the coöperation of a great number of investigators. Such studies have been made by government agencies and by public organizations. Throughout this book the data of such studies have been used. The great body of evidence, however, has been ascertained by a study of data which on the face of them do not appear to represent habits of living, but in reality do reflect American economic life. These data have been listed in the bibliography given in the final chapter, to which specific reference should be made for detailed information of sources discussed in this section.

The Census Reports are such data. The volume on manufactures gives quantitative data on the raw materials of most commodities consumed by the people of the nation. It also gives data showing the chief products of most industries. It is thus possible to ascertain with respect to food, clothing, and household materials exactly what the nation consumes. Concerning most articles of food, the best figures are furnished by the United States Department of Agriculture in its yearbook. In this study much labor has been saved by using Raymond Pearl's summary of the consumption of the chief food commodities for the years 1911 to

1918, contained in *The Nation's Food.* The United States Bureau of Markets publishes data from time to time giving production and consumption figures of important food commodities. The United States Food Administration, which functioned during the war, has published in its various books and pamphlets much valuable information concerning the food habits of our nation.

Concerning housing conditions, valuable data are contained in the reports of the United States Housing Corporation, which operated during the war. The United States Bureau of Labor Statistics publishes monthly data concerning housing in its *Monthly Labor Review.* In addition, it has printed several lengthy bulletins on building construction in the United States. The United States Geological Survey and the United States Bureau of Mines publish the best data concerning the fuels of the nation. The Smithsonian Institution, too, has made valuable studies of the energy resources of the country. The Fuel Administration, created to meet the war emergency, has published valuable data on fuels.

The United States Tariff Commission and the United States Federal Trade Commission are the federal departments which give information on clothing, although the census figures are fairly complete. For general information concerning most articles consumed by the American people the *Tariff Information Surveys* are invaluable. The pamphlets contain data on the raw materials, products, and trade practices for every important commodity. A similar series of pamphlets, prepared in 1918 by the War Industries Board, gives detailed data on fifty-seven important commodities. The United States Bureau of Foreign and Domestic Commerce publishes annually a statistical abstract, a ready reference to some but not to all of the data required in studying the economic habits of the people of our nation. Several studies by state and municipal departments have been used.

Industry is dependent upon government agencies for statistics to determine trade policy. When government data are not adequate, independent research is carried on by various trade agencies. Every industry has its national organization which maintains research bureaus, publishes a journal of proceedings of conferences,

and occasional bulletins. In this study data has been used which were published by Chambers of Commerce, Real Estate Boards, the National Industrial Conference Board, the Merchants Association, the National Association of Wool Manufactures, and several other national organizations. Large business organizations find it to their advantage to maintain private research departments which publish data on economic conditions. The publications of banks are examples of this type of data used in this book.

The demand of industrial concerns for information on business conditions has led to the establishment of a large number of trade journals and private research bureaus. *Crain's Market Data Book and Directory* furnishes market data in a convenient form which often saves the labor of studying original sources. Such trade papers as *The Textile World, The American Food Journal, Furniture Manufacturer and Artisan, Building Age*, and the like, used as sources of information in this study, contain an immense amount of data which reflect consumers' practices.

Semi-public agencies of research publish books, pamphlets, bulletins, and journals which give data from an impartial viewpoint. Data of this type used in the study were the reports of the National Bureau for Economic Research, of the Bureau of Applied Economics, and of the research bureaus of several universities; publications of the Russell Sage Foundation and of the National Housing Association; and the *Journal of Home Economics*. Labor has not yet made great progress in the technique of economic research, but a few studies have appeared and they have been used. Several independent studies of economic conditions have been used, such as W. I. King's *Wealth and Income in the United States*.

Direct surveys of the habits of the people have been made with respect to food, fuel, and clothing consumption, and housing. A large number of studies were used in connection with food, clothing, housing, and fuel, which are listed in the final chapter on bibliography. The most comprehensive study is that of the United States Bureau of Labor Statistics, which included over twelve

thousand families in ninety-four representative localities in the United States.

III. DATA ON STANDARDS OF CONSUMPTION

With respect to the standards of consumption of food, shelter, fuel, and clothing the data is of various kinds.

Concerning food the nutritive standards have been worked out by the United States Department of Agriculture and by various dietary experts. These same standards from the point of view of budgetary practice have also been worked out by economists like W. F. Ogburn and by bureaus of research like the Philadelphia Bureau of Municipal Research. Both types were used in this study. Housing standards used were those of the United States Department of Labor and of several semi-public agencies. The standards of clothing consumption were usually published in general studies on standards of living. The Bureau of Applied Economics and the National Industrial Conference Board have made convenient summaries of such studies. These were usually quantitative statements of the requirements of individuals for decent living.

There are certain standards of practice with regard to consumption which have been established by law, such as building codes and the food laws.

Scientific law lays down standards of practice with respect to nutrition, ventilation, the strength and chemical structure of materials, heat value of fuels, effect of color and lighting. Scientific experiments have been made by industrial organizations, universities, scientific societies, and private investigators, to ascertain norms of strength, quality, and utility. Such data were also used as a basis of comparison. The United States Bureau of Standards and the United States Department of Agriculture publish bulletins giving practical details of approved practice of purchase and use of common commodities. The *Farmers' Bulletins* of the Agriculture Department were used often.

Technical books on special industries and products treat with scientific accuracy on the relative value of materials which are

commonly consumed. They discuss impartially the effect of natural and artificial conditions under which materials are used. Trade publications which are not intended for the consumer discuss frankly the merits of raw materials and products, indicating clearly what is good and what is bad. Practical books, written primarily for the consumer to help him to use economic goods effectively, contain standards of quality and use of materials. The pamphlets of the United States Tariff Commission contain frank discussions of the raw materials and products of nearly all the common articles used in the home. Manuals for retail salesmen in the various trades contain frank information about goods; these indicate what practices are most advantageous to consumers. During the war the United States Food Administration, the United States Fuel Administration, and the United States Housing Corporation enlisted the services of the best experts in the country to gather and to disseminate information to help the consumer to purchase and use economic goods effectively.

IV. COMPARISON OF ACTUAL CONDITIONS WITH STANDARDS

Usually, the comparison in this study between present actual practice of consumption and approved standards of consumption was made quantitatively. It would take too much space to enumerate all the quantitative comparisons which were made. A few typical examples of the calculations made were concerned with the following subjects: the consumption of food commodities by weight, by money value, and by nutritive value; the relation of nutritive value to the cost of food commodities; the comparative cost of food bought in packages and in bulk; the relation of income to home ownership; the relation of home ownership to the care of a house; the durability of lumber for furniture and building; the reflection value of interior colors; the skills practiced in the home; the extent of household calculation and measurement; the energy value of the chief fuels; the kinds of gas mantles in use; the quantity and quality of the chief articles of clothing; and the durability of furs.

Often the habits of living could be expressed quantitatively and the standards could not, and *vice versa*. In such cases the comparison was made as specifically as possible without making numerical calculations. For example, it was possible to demonstrate that ready-mixed paints are more expensive than paints mixed in the home and of inferior quality, but it could not be demonstrated exactly to what extent ready-made paints were used by the American people. This, however, did not seem sufficient cause to fail to recommend that the people of this nation should guard against purchasing poor ready-mixed paints and should learn to mix paints in the home.

With respect to some economic activities no quantitative data exist to indicate exactly what present practice is or what the standards of practice should be. In such cases it was first necessary to demonstrate that the activity was a fundamental one and then to recommend in accordance with the best available evidence what the objective of training should be. For example, the wool-fiber rug is a very recent product and no substantial evidence exists to show how extensively it is used or how adequately it meets the tests of home use. Yet its increase in use during the last eight years and its low cost indicate that the great mass of low-salaried wage-earners should know something about the quality of this new product.

V. THE EDUCATIONAL OBJECTIVES

The basis of selection of the economic objectives to be recommended was quantitative in the main. The chief foods, types of dwelling, household materials, household skills, fuels, articles of clothing, articles of furniture, and the like were ascertained quantitatively. The aim was to discover what affected life most vitally.

The quantitative comparison between modes of living and standards of living yields conclusions which become objectives of educational activity. The objectives are given at the end of each section. Here it is possible only to give several types of objectives selected at random. One type is concerned with the acquisition

of information. For example, the mastery of economic life requires the learning of a vocabulary which the mass of people now do not possess. It requires that persons shall know the nutritive value of cheese, relative cost of meat and beans as protein foods, the most durable leather for shoes, the effect of heat on raincoats, and the like. Another type of objective is concerned with the development of habits, such as: eating less meat; eating more fruit; reading the electric meter and the like. Another type of objective is concerned with the development of attitudes which give approval or disapproval of economic conditions and proposals, such as an attitude toward food in relation to health; toward the home in relation to family life; toward clothing in relation to social life and the like. The objectives are the conclusions of this study. It is intended that the curriculum-maker shall select, refine, and organize them to conform to the chief factors of education and to the needs of any particular educational enterprise.

Difference between This and Other Curriculum Studies

The method of determining objectives of the curriculum used in this book belongs to that class of studies which uses quantitative data describing actual life conditions in order to determine what shall be learned in school. This method was employed by Leonard P. Ayres[1] when he analyzed two thousand actual letters to ascertain what words the ordinary man should learn to spell. It was employed by G. M. Wilson [2] to determine the content of arithmetic by a survey of the actual problems in the business and social life of 4068 persons. It was used by H. O. Rugg to ascertain the content of a course of study in social problems by a quantitative analysis of 140 crucial books.

I. DOES NOT BEGIN WITH A FORMAL SUBJECT

In certain respects, however, this study is different from other studies of actual conditions of life as a basis of curriculum con-

[1] Ayres, L. P. — *The Spelling Vocabularies of Personal and Business Letters;* Russell Sage Foundation, 1913.
[2] Wilson, G. M. — *A Survey of the Social and Business Usage of Arithmetic;* 1919.

struction. First, this study does not begin with a formal subject; it begins with a phase of life. To illustrate, Carleton Washburne's [1] study of questions and experiences originated in an attempt to determine the content of science. On the other hand, E. M. Todd [2] desired to ascertain physical defects; H. O. Rugg set out to discover the most crucial contemporary problems; and the writer wished to ascertain the actual needs of economic life.

II. NOT A DIRECT SURVEY OF THE ACTUAL NEEDS OF THE LEARNERS

Second, this study is not a *direct survey of the actual needs* of the learners, as was W. W. Charters' analysis of the language errors of the pupils in the Kansas City schools. It is, however, a study of *quantitative data which describe the actual needs* of the American people for effective economic living. In this respect it differs from such studies as G. M. Wilson's first arithmetic study [3] and Franklin Bobbitt's study [4] of curriculum-making in Los Angeles, which were quantitative studies of what a selected group of qualified persons *think are the outstanding needs.* Thus, the curriculum studies based on quantitative evidence may be classified by the degree to which they are removed from the learner. According to this classification, W. W. Charters' survey, the present study, and G. M. Wilson's and Franklin Bobbitt's studies are, respectively, one, two, and three degrees removed from the learner. Of course, direct surveys of pupils' needs are possible for only a very narrow phase of life, such as language errors and physical defects, and for a relatively small group. Such studies require a great deal of time and labor and the coöperation of many persons. It will therefore be necessary in most curriculum studies to use quantitative data which describe as accurately as possible the needs of the people in a given area without making an actual canvas.

[1] From a mimeographed prospectus distributed by the World Book Co., Yonkers, N. Y.
[2] Todd, E. M. — "Provisions in the High School Curriculum for Correcting Physical Defects"; *Journal of Educational Research*, III, No. 1.
[3] Wilson, G. M. — *Course of Study in Mathematics, Connersville, Indiana.*
[4] Bobbitt, Franklin — *Curriculum-Making in Los Angeles.*

III. COMPARES ACTUAL WITH STANDARD CONDITIONS

Third, this study compares the actual modes of living with quantitative evidence of approved standards of living. For example, in this study the present per capita consumption of fruit was compared with a quantitative standard determined by experts, which comparison showed that the present consumption of fruit was far below what it ought to be. It should be remembered that in other studies based on quantitative data standards of approved practice are not ascertainable. For example, when E. L. Thorndike ascertained quantitatively what were the most important words actually used in children's books there was no way of determining whether they were the best words children ought to use. On the other hand, there are studies in which the standards of right practice are easily ascertainable. For instance, in order to ascertain the grammatical errors of children, it was only necessary to compare the constructions the children actually used with the rules of grammar which are fairly well fixed.

Studies of the type of this book are applicable to political life, recreational life, the physical condition of the people, and the like. The data may be more readily available with respect to economic life, but there is no doubt, judging from experience thus far, that there is a tremendous amount of unused data which, when collected, should serve to make selection of content more scientific in every branch of the curriculum.

Use of the Results of This Study

The body of this book is a description of the economic habits of the consumer. It is the evidence collected, upon which our conclusions are based. How to use these data may puzzle the administrator and teacher.

I. BY THE CURRICULUM-MAKER

Primarily, this study has been made for the curriculum-maker who is casting about for sound data on which to make a revaluation

of curriculum content. To him this work demonstrates the importance to life of certain economic activities. Furthermore it suggests a complete program of activities designed to make the learner a more effective consumer of economic goods. While it is not proposed to treat this content as a separate course of study, it is conceivable that in a reorganized curriculum kinds of consumption will have a place beside other purposeful activities.

Experimental schools are searching about for a new content based upon the experiences of life and falling readily into a natural organization of projects in life guided by essential purposes. They will find here that the recommendations are presented as a body of aims from which may be selected those which conform to the needs of a particular school. There are ends which apply to child life and ends which apply to adult life. No attempt has been made to apply a psychological criterion for the selection of content; the criterion applied is essentially a sociological one. For example, we have found that it is essential to know how to calculate the cost of a quarter of a pound of butter when it costs fifty-two cents a pound. This a child would be likely to do in life. Further, we have found that it is essential that the house-owner should know how to calculate his property tax. This an adult would be likely to do. However, both are essential, and in this treatment both child and adult objectives of education have been included.

2. AS MATERIAL IN SOCIAL SCIENCE AND HOUSEHOLD ECONOMY

It is probable that at present the designer of the course of study in social science and household economy will find this book more useful than any other worker in education. He will find that certain content is definitely recommended because the evidence shows that it is vital to effective living. It should be remembered, however, that the recommendations proposed in this study are made on the theory that pupils shall do things, that they shall form habits of living. It may easily be construed that this work intends that pupils shall know new facts about living. This is in no sense

the primary purpose of this study except when *to know* facts about living is necessary in order *to do* things in life.

Let us assume that the teacher of social studies wishes to include the fuel problem in his course. He is not certain whether his pupils should put greatest emphasis on coal, gas, kerosene, wood, or electricity. The section of this study on fuel consumption will furnish quantitatively the relative importance of these fuels. If he has neglected to consider gas, let us say, he will find that it is not much less important than coal as a fuel. And if he wishes to emphasize household consumption exclusively, he will find that gas is more important than coal. He will find further the particular problems which the utilization of coal presents and the particular problems which the utilization of gas presents. He should get some assistance in determining exactly what should be learned by his pupils with respect to the chief fuels.

Let us assume that a teacher wishes to ascertain in a general way what pupils should learn with respect to furniture in the home. On turning to the section on *Furniture* in the chapter on *Household Materials* he finds the best available data showing specifically what woods enter into furniture. He finds information concerning the relative importance of these woods. He discovers what species of wood enter into bookcases, kitchen cabinets, phonographs, and the like. He discovers the common methods of finishing woods to make them appear more expensive than they really are. He finds data giving the durability of the woods actually used in furniture. Following the presentation of such data, specific topics of study on furniture are recommended. For example, he discovers that pupils should learn to know the common furniture woods and their relative durability and costs; to distinguish birch from mahogany; to identify a veneer; to identify the print of quartered oak on cheaper woods, etc.

III. BY TEACHERS OF THE SPECIAL SUBJECTS

Let us assume that the teacher of science wishes to make his course more practical, to introduce content from life experiences.

A cursory examination of the book will indicate the outstanding units of activity and materials which should be included in a practical course in science. Let us assume further that he is in doubt as to whether electricity or soap should be treated more fully. A reading of the two sections will show the relative importance of these two items in the budget and a comparison of the real difficulties which these items present to the consumer. Suppose, further, that he has decided to include a consideration of soap in his course of study. In the section on soaps he finds the chief chemical ingredients of soap in terms of raw materials, such as grease, caustic soda, sodium silicate, etc. He finds that genuine soap is dependent upon the right mixture of oil and alkali. He finds the relative cleansing powers of different kinds of soap, which gives him an opportunity to demonstrate this according to chemical science. He finds that there is hard soap and soft soap as a result of the presence of caustic soda or caustic potash. The adulterants in soaps are given, which leads to simple projects in chemical analysis. The science teacher may know all these things, but he wishes to be guided as to their relative importance and to their utility. Such a work as the present can furnish him guidance.

Let us assume that the teacher of arithmetic has been troubled about selecting content which will help the pupil to solve his problems in connection with the consumption of clothing. In the chapter on clothing he will find the chief measures, the chief fractions, the chief measuring tools, and the chief arithmetical processes used in connection with the consumption of clothing as they relate to the actual utilization of clothing in everyday life.

Let us assume that the language teacher wishes to ascertain a vocabulary which will make the pupil an intelligent purchaser of shoes. On consulting the section on shoes the language teacher discovers the words which denote the various parts of the shoe, the upper, the vamp, the tongue, etc. He discovers the names of the principal leathers which enter into shoe manufacturing; the principal kinds of finish which enter into the selling name of a shoe; and the kinds of soles which are the indices of quality.

Let us assume that the teacher of manual arts wishes to determine what projects are most essential in a school course. In the chapters on housing, household materials, household skills, and fuels, he will find a list of skills carefully selected because they contribute to the maintenance of the home, to the durability of the household equipment, to the reduction of waste, and to the meeting of the common emergencies in the home. He will find information on materials which will bring his work into close relation with actual industrial conditions and processes.

The Task Outlined

We have indicated the need for the utilization of quantitative evidence as a basis for curriculum reconstruction, a complete method of which was proposed, requiring the coöperation of the sociologist, the psychologist, and the administrator in education. The task of the first of these experts will be undertaken with respect to economic life. This task is the determination of educational objectives for effective economic life with special reference to the consumption of commodities.

Quantitative evidence of present habits of selection, purchase, marketing, storing, and preserving of foods will be compared with efficient practice. The conclusions from this comparison will be presented as objectives of education with respect to food consumption. The housing conditions of the nation will be compared with the most widely approved housing standards and the conclusions will again be presented as educational objectives. A similar treatment of household materials and household skills will follow. The general conditions of fuel consumption, the special practices with respect to lighting and heating will be considered in the light of standard practice and the conclusions will again be recorded. Finally, the consumption of clothing will be treated quantitatively from the point of view of the chief fabrics and also from the point of view of the chief articles of clothing. The comparison with quantitative standards will result in recommendations for the improvement of the habits of the utilization of clothing.

CHAPTER II

FOOD CONSUMPTION

Its Place in Economic Life

The selection, purchase, and use of food combine to form one of the fundamental processes of economic life. At the present stage of development of the race this process is performed with a great deal of imperfection. The theory of proper food consumption is far ahead of present practice. We have discovered much about nutrition, but we have not really begun to convert what knowledge we have into food habits. The data which will be presented in the two following chapters indicate that the American people, especially, need to reorganize their habits of food consumption. In order that schools may participate in this reorganization it is necessary to ascertain specifically what knowledge, habits, and attitudes our present population need to acquire.

The consumption of food for the great mass of people is now governed by custom. Many families in the United States have an income which is not enough to supply the daily food that the human being requires in order to live decently. For this part of our population an improvement in food habits is vital. According to the best estimates, the American people waste about 10% of the edible food which is purchased. Considered from a national viewpoint, this is a tremendous waste which our people cannot afford. In view of the present ignorance, waste, and insurmountable economic difficulties, it is of first importance to formulate objectives for the reorganization of food habits. Such is the purpose of this chapter.

The Chief Foods of the Nation

Raymond Pearl [1] has discovered that the great bulk of our food consumption is limited to several important food commodities.

[1] Pearl, Raymond — *The Nation's Food*, 209 f.

If the food habits of our nation show any serious defects, they should appear in the data concerning these chief food commodities. Greatest progress will be made if we concentrate our efforts upon them.

Wheat, dairy products, beef, and pork furnish nearly 75% of the total protein consumed. Wheat, sugars, corn, potatoes, and dairy products furnish 90% of the carbohydrate intake. The sugars contribute twenty times as much carbohydrate for the nation as rice. About 40% of the total fat consumed by the nation comes from pork and its products. Pork, dairy products, vegetable oils, and beef furnish 87% of the total fat intake. Wheat, pork, and dairy products furnish 57% of the energy content of the nation's food. These commodities, together with sugars, corn, beef, vegetable oils, potatoes, poultry, and eggs, furnish 91% of the nutritional intake of our population.

The conclusion from these data is, clearly, that first importance in the selection, purchase, preparation, and storing of foods should be given to grains, meats, dairy products, vegetables, sugars, and eggs; and to meet the requirement of mineral salts we must add fruits.

Objectives Concerned with the Chief Foods of the Nation

To know that wheat, dairy products, beef, and pork are the great sources of protein.

To know that wheat, sugars, corn, potatoes, and carbohydrates furnish nine-tenths of all the carbohydrates.

To know that pork, dairy products, vegetable oils, and beef furnish nearly nine-tenths of all the fat intake.

To know that nine-tenths of the total nutrition of the nation is derived from wheat, corn, pork, beef, the dairy products, poultry, eggs, potatoes, and vegetable oils.

Food Selection Based upon Quantity Consumed

The available evidence as to the food habits of our nation is of two kinds. The first is the statistical data furnished by the federal departments, chief of which is the Department of Agricul-

ture, giving gross and per capita figures of food production for the entire nation. The second is the data reported in food studies of communities made in some cases to ascertain the standard of living of a community and in others to ascertain the habits of consumption with respect to special food commodities, such as milk.

All the evidence of the first type for the years from 1911 to 1918 has been tabulated and converted into terms of the food elements by Raymond Pearl in a noteworthy volume entitled *The Nation's Food*. A comparison of the data showing what the people of our nation actually consume with figures given in the most reliable standards of food consumption will give us the basis for some of our educational objectives with respect to food consumption.

Dr. Pearl's figures of consumption are given in total metric tons of each food commodity consumed, as well as in the amount of protein, carbohydrate, fat, and caloric value derived from each food commodity. Since several of the standards of food consumption are given in pounds per week, we shall first give a percentile comparison of actual with standard conditions by weight. The standards used here were those of M. E. Jaffa,[1] L. H. Gillett,[2] W. F. Ogburn,[3] C. L. Hunt,[4] and the Bureau of Labor Statistics.[5]

Such a comparison (TABLE I) shows clearly that the nation as a whole does not consume enough vegetables and fruits. On the other hand, the nation consumes too much meat. Americans consume at least twice as much sugar as the French and English and two-and-a-half times as much fat as we need.[6]

The evidence of the second type consists of studies of the food habits of family groups. The studies used here were a median of 92 low-income dietaries investigated by Sherman and Gillett[7] and 105 families reported by Phillips and Howell.[8] We find that

[1] JAFFA, M. E. — Quoted from *Standards of Living;* Bureau of Applied Economics, 119.
[2] GILLETT, LUCY H. — *Journa of Home Economics*, XII, 323, July, 1920.
[3] OGBURN, W. F. — Quoted from *Standards of Living;* Bureau of Applied Economics, 93.
[4] HUNT, C. L. — *Farmers' Bulletin 1223*, 9.
[5] United States Bureau of Labor Statistics. Quoted from *Standards of Living;* Bureau of Applied Economics, 4 f.
[6] United States Food Administration; *The Day's Food in War and Peace*, 13.
[7] SHERMAN, H. C., and GILLETT, L. H. — *Adequacy and Economy of Some City Dietaries*, 32; 1917.
[8] PHILLIPS, V., and HOWELL, L. — "Racial and Other Differences in Dietary Customs"; *Journal of Home Economics*, XII, 396–411, September, 1920.

considerably more meat is consumed than is needed and not enough dairy products are consumed. Since oleomargarine and other fats can be substituted for butter without any loss in nutritive value, the dairy products which are underconsumed are milk and cheese.

We have not included in our table the results of an extensive study of 11 localities reported by W. F. Ogburn in the *Monthly Labor Review*, August, 1919, because to present his results accurately it would be necessary to reproduce his complete table, which is too detailed to convert into percentile terms. His own general conclusions, however, are that the amount of milk consumed in several localities is far below the amount desirable; that the dietaries are not specially high in cereals, nor are they specially low; that there is no shortage in consumption of meat, sugar, and fats; and that families usually fall below the fruit standard

TABLE I[1]

CONSUMPTION OF CHIEF FOOD COMMODITIES BASED ON WEIGHT
(Amounts given in per cent of total)

	Standard Conditions					Actual Conditions		
	JAFFA	GILLETT	BUR. OF LABOR STATISTICS	HUNT	OGBURN	PEARL	SHERMAN GILLETT	PHILLIPS HOWELL
Dairy products[2]	26.1	33.9	26.1	27.9	30.6	33.7	19.4	20.4
Meat	10.9	5.6	10.0	4.0	10.6	12.0	13.6	11.7
Fish		.5		2.2		1.3	1.5	
Eggs	1.3	.8		1.2	2.1	1.7	2.2	1.2
Potatoes	7.6	15.3	28.0	11.3	10.6	8.9	12.6	
Vegetables	13.7	8.1		19.4	10.6	3.8	19.3	24.6
Fruit	10.9	6.2	13.4	13.7	10.6	6.2	13.0	
Grains	20.0	25.2	16.1	14.0	18.0	25.2	25.4	34.5
Sugar and molasses	5.4	3.4	3.3	4.0	4.4	6.8	4.9	3.0
Oils and nuts (fats)	4.0		3.1	2.0	1.3	6.2	.3	2.3
Coffee and tea	.4				.9		1.1	2.1

[1] In the construction of this table it was necessary in some cases to combine items in order to make the various studies agree. When the units were not given in weight it was necessary to make the conversion according to tables of equivalents. All weights were reduced to percentile figures in order to facilitate comparison.

[2] The figure for dairy products needs to be explained.
Pearl's figure for dairy products is based upon the weight of raw milk utilized, while the

Objectives Concerned with the Selection of Food by Weight

To know the relation in general terms between the weight of food and its nutritive value.

To know roughly the amount of calories, protein, and ash in the common weights and measures of food.

To consume more vegetables and fruits by weight.

To consume less meat, fats, and sugar by weight.

To consume more dairy products by weight.

Food Selection Based upon Amount of Money Spent for Chief Food Commodities

The evidence used to show the habits of disbursement for food consists of reports of money expended by several large groups which were studied in the last two decades. The items of expense were grouped and converted into figures giving the per cent which each commodity is of the total food cost. The proposed standards were similarly converted and the comparison was made. The percentile comparison employed here reduces the effect of price changes considerably.

The standards used were those worked out by M. E. Jaffa,[1] the New York City Board of Estimate,[2] Philadelphia Bureau of Municipal Research,[3] and the Canadian Department of Labor.[4] For comparison with these standards the following studies were used: 92 dietaries, almost all in New York City, covering a wide range of nationalities having an average daily cost of 32.9¢ in 1914–1915;[5] 88 families in the District of Columbia having an average monthly income of $101.05, made by the United States

standards are given in weight of butter, cheese, etc. It was first necessary to convert metric tons of raw milk into metric tons of butter, cheese, and condensed milk. This was done by ascertaining the percentage of raw milk utilized in making butter, cheese, and condensed milk and multiplying it by the total amount of raw milk. The amount of raw milk used in each product was multiplied by the per cent the weight of each product is of the weight of raw milk. The total weight of each product was then in the same terms as the standards. Pearl's figure for dairy products is high because it includes all the products of milk manufacture, such as condensed milk, ice cream, etc., and because, as will be seen later, the consumption of raw milk on farms is far greater than it is in cities.

[1] Jaffa, M. E. — *Standards of Living;* Bureau of Applied Economics, 119.

[2] New York City Board of Estimate. Quoted from W. J. Lauck — *Cost of Living and the War*, 150.

[3] Bureau of Municipal Research of Philadelphia; *Workmen's Standard of Living in Philadelphia*, 53–54.

[4] Canadian Department of Labor. Quoted from W. J. Lauck — *Cost of Living and the War*, 108.

[5] Sherman, H. L., and Gillett, L. H. — *Adequacy and Economy of Some City Dietaries*, 9.

Bureau of Labor Statistics in 1917;[1] 1036 American-British workingmen's families having an income of from $14.60 to $19.47 per week, reported by the British Board of Trade in 1911;[2] 105 families in New York City of low income, reported by Phillips and Howell;[3] 184 typical Chicago stockyard families having an average annual income of $801.49, reported by J. C. Kennedy;[4] and 2567 workingmen's families, studied by the United States Bureau of Labor Statistics.[5]

TABLE II

CONSUMPTION OF CHIEF FOOD COMMODITIES BASED ON AMOUNT OF MONEY SPENT

(Amounts given in per cent of total)

	STANDARDS				ACTUAL CONDITIONS					
	DEPARTMENT OF LABOR, CANADA	JAFFA STANDARD	PHILA. STANDARD	N. Y. C. BOARD OF ESTIMATE	SHERMAN AND GILLETT, 92 DIETARIES	88 FAMILIES, WASHINGTON, D.C.	1036 AMERICAN-BRITISH FAMILIES	184 CHICAGO STOCKYARD FAMILIES	2567 WORKINGMEN'S FAMILIES	105 FAMILIES IN NEW YORK CITY
Dairy products[6]	24.9	23.2	21.0	18.8	10.2	16.0	15.3	20.5	16.1	12.0
Meat	25.5	22.9	22.3	18.4	33.2	26.1	25.7	24.1	31.4	26.0
Fish			2.7	2.4		3.3	2.0	3.3	2.5	
Eggs	8.5	3.6	7.1	8.6	5.6	5.6	6.1	5.4	5.1	5.3
Potatoes	4.9	3.3	7.2	6.5		3.5	5.2		4.0	
Vegetables	5.1	6.5	5.1	14.1	9.1	7.2	7.8	10.0	5.8	14.3
Fruit	3.0	7.9	3.0	3.9	6.0	5.4	3.7	7.0	5.1	
Grains	17.0	11.4	17.0	20.9	17.9	17.3	18.8	20.0	9.6	25.4
Sugar and molasses	4.3	4.8	4.3	1.6	3.8	4.8	4.0	2.6	5.3	3.0
Oils and nuts (fats)	7.7	6.0	7.7	2.7	8.1	1.8	2.7	1.1	2.9	8.6
Coffee and tea	2.9	3.2	2.9	4.1		3.2	5.3	3.6	4.9	
Miscellaneous		7.3				5.6	3.3	1.4	7.5	5.4
Nuts	.1		2.6	.7	.4					

[1] United States Bureau of Labor Statistics; *Monthly Labor Review*, 589–590, September, 1918.

[2] British Board of Trade, 1911; *Cost of Living in American Towns*, 46.

[3] PHILLIPS, V., and HOWELL, L. — "Racial and Other Differences in Dietary Customs": *Journal of Home Economics*, XII, 396–411, September, 1920.

[4] KENNEDY, J. C. — *Wages and Family Budgets in Chicago Stockyards*, 71–72.

[5] United States Commissioner of Labor; *Annual Report, 1903*, 650.

[6] Includes butter.

A comparison of actual food habits with standards (TABLE II) shows clearly that not enough money is spent for dairy products, that more money is spent for meat than is required and that too little is spent for eggs.

Objectives Concerned with the Selection of Food Based on Money Expenditures

To spend a proper proportion of money for dairy products.
To spend less money for meat.
To spend less for coffee and tea.

FOOD SELECTION TO MEET THE DAILY ENERGY REQUIREMENT

The most reliable comparison of actual food habits with standards is one based on the nutritive elements in the chief food commodities. The one element which is the best index of food value is the quantity of calories consumed. Indeed, Dr. Pearl contends that the only accurate basis of comparison between his statistics of consumption and the proposed standards is the caloric basis. For the purpose of this comparison the best obtainable standard in terms of caloric consumption was that of Dr. Anton R. Rose, who studied diets which had proved satisfactory. Dr. Pearl's figures[1] were regrouped to conform to this standard, as were those found by Sherman and Gillett. The conclusions from this comparison (TABLE III) are that legumes, vegetables, and fruits are underconsumed, and that meat, sugar, and fat are slightly overconsumed. The apparent adequate consumption of milk, according to Pearl, really includes manufactured products such as cheese, condensed milk, and ice cream. Here, in most general terms, we have as brief a statement of the American problem of food consumption as can be carefully given in a few sentences.

These conclusions, obviously, do not apply to every community nor to every family. They indicate, in the first place, where the deficiency in food consumption is most likely to occur; and, in

[1] PEARL, RAYMOND — *The Nation's Food*, 236 f.

the second place, that every community will have its peculiar problems which can be ascertained only by a study of local consumption figures or local food surveys.

TABLE III

RELATION BETWEEN STANDARD AND ACTUAL CONSUMPTION OF FOODS IN CALORIC UNITS

(Amounts given in per cent of total)

ITEM	ROSE STANDARD[1]	FROM PEARL	FROM SHERMAN AND GILLETT[2]
Grain products	35.0	34.7	37.8
Legumes	3.0	.8	
Vegetables and fruits	15.0	4.2	13.0
Sugar and syrup	9.0	13.2	10.8
Fats	8.0	10.8	10.6
Milk and cocoa	8.0	10.0	9.0
Meats	22.0	24.1	18.2
Potatoes	7.0	3.7	
Miscellaneous			.6

The total energy requirement for an adult man per day is between 3000 and 3500 calories. The problem for the great mass of our people is so to order their food purchases as to extract this requirement. W. F. Ogburn's[3] comprehensive study of 13,000 families in 92 cities having an income between $1200 and $1500 gives a very good picture of our problem in urban communities. From the 13,000 families in 92 cities, Ogburn selected 20 to 30 dietaries in each of 11 representative cities. Each family selected averaged approximately 3.35 equivalent adult males. The average cost of food for the families in each city represents the actual cost of an adequate dietary in that city. Applying this standard to all the dietary studies made in each city Ogburn ascertained the percentage of families which fell below the standard. His figures

[1] *Modern Hospital*, XIV, 487, June, 1920.
[2] SHERMAN, H. C., and GILLETT, L. H. — *Adequacy and Economy of Some City Dietaries*, 9.
[3] OGBURN, W. F. — "A Study of Food Costs in Various Cities"; United States Bureau of Labor Statistics; *Monthly Labor Review*, 303–327, August, 1919.

show that from 61% to 89% of the families studied received less than 3500 calories and from 33% to 74% received less than 3000 calories per adult male per day.

The careful study of 92 dietaries made by Sherman and Gillett [1] in New York City in 1914 shows that 58% of the families studied got less than 3000 calories at an average cost of 32.9¢ per man per day. Thus it is quite clear that here is a problem for educators to think about.

Objectives Concerned with the Selection of Food to Meet the Daily Energy Requirements

To consume more beans and peas.
To consume more vegetables and fruits.
To consume less meat, sugar, and fats.
To know the chief energy-giving foods.
To eat more potatoes.
To ascertain roughly the cost and quantity of food necessary to meet the daily energy requirement.
To ascertain whether one's ordinary diet is deficient or excessive in caloric value.
To cultivate the attitude that the health of the nation is dependent upon an adequate income to supply the minimum energy requirements of man.

Selection of Food to Furnish the Requirements of Proteins, Fats, and Mineral Salts

A further test of the deficiencies of the food habits of our people is a quantitative comparison of standard and actual conditions of consumption of proteins, fats, carbohydrates, calcium, iron, and phosphorus. This comparison (Table IV) indicates that there is an overconsumption of proteins and fats. This finding agrees with previous results concerning the overconsumption of meat — one of the most concentrated protein foods and an important carrier of fats.

The underconsumption of calcium and other mineral salts is demonstrated in the figures of Sherman and Gillett, and Phillips

[1] Sherman, H. C., and Gillett, L. H. — *Adequacy and Economy of Some City Dietaries*, 6.

and Howell. This is in harmony with the data which show underconsumption of milk, vegetables, and fruits, which are especially rich in mineral salts. Sherman and Gillett [1] found that 49% of the 92 dietaries studied by them received less phosphorus, 53% received less calcium, and 41% received less iron than the required standard. Phillips and Howell [2] found that 62% of the 105 families on which they reported were below the standard of phosphorus consumption, 57% were below the standard of calcium consumption, and 51% were below the standard of iron consumption.

TABLE IV

STANDARD AND ACTUAL CONSUMPTION OF THE CHIEF NUTRIENTS IN GRAMS PER MAN PER DAY

STUDY	PROTEIN	FATS	CALCIUM	IRON	PHOSPHORUS
STANDARD CONDITIONS					
Sherman and Gillett, 1920 [3]	75		0.69	0.015	1.44
Ogburn, 1918 [4]	100	115	0.70	0.015	1.32
ACTUAL CONDITIONS					
Pearl (for 1911–1918) [5]	114	127			
Sherman and Gillett	109		0.72	0.018	1.60
Phillips and Howell	90	85	0.61	0.012	1.30

The data discussed thus far go right to the heart of the problem of the reconstruction of food habits by education. Here we have evidence of the inadequate consumption of food commodities, such as fruits; of overconsumption of other food commodities, such as meat; of ignorance of the great value of some food articles, such as legumes; and of the inability of a large part of the population to purchase the daily requirement of energy. This is a most serious situation which affects the health, stamina, and the economic productivity of the nation: it is a situation which challenges the schools of the nation to action.

[1] SHERMAN, H. C., and GILLETT, L. H. — *Adequacy and Economy of Some City Dietaries*, 7.
[2] *Journal of Home Economics*, XII, 396–411, September, 1920.
[3] SHERMAN, H. C., and GILLETT, L. H. — *Adequacy and Economy of Some City Dietaries*, 5.
[4] Bureau of Applied Economics; *Standards of Living* (Revised Edition), 93.
[5] PEARL, RAYMOND. — *The Nation's Food*, 248.

Objectives Concerned with the Selection of Food to Meet the Daily Requirement of Proteins and Mineral Salts

To know the function of protein, fats, carbohydrates, calcium, iron, and phosphorus in the diet.

To select food with an eye to its dietary functions.

To assure the presence in every meal of: (1) fruits and vegetables (2) protein foods (3) cereals and starchy foods (4) fatty foods.

To guard against the overconsumption of fats.

To guard against the overconsumption of proteins, particularly in the form of meat.

To consume a sufficient quantity of milk, vegetables, and fruits.

To consume a sufficient quantity of calcium and iron in foods.

To know the foods rich in protein, carbohydrates, calcium, phosphorus, and iron.

The Consumption of Milk and the Dairy Products

Thus far, the educational recommendations have been based upon certain general food conditions. Food, however, is purchased by commodities, the use of which forms the basis of the food habits. We shall therefore proceed to discuss the important food commodities separately.

Because milk is of supreme importance as a food for children and because it furnishes abundantly such a variety of nutritive elements, the production and consumption of milk have been widely studied. The studies thus far reported show that milk is underconsumed. The census reports show that increasingly raw milk is going into the manufacture of milk products. Happily, this increase is largely at the expense of butter production, which in 1919 used up 37% of the total milk supply, and which can be replaced by oleomargarine and other fats. The danger, however, is that the present low per capita consumption of raw milk will be additionally reduced.

The standard of daily milk consumption generally agreed upon is one pint for children and one cup for adults. The United States Bureau of Markets gives the following data concerning the household consumption of milk.

TABLE V

HOUSEHOLD CONSUMPTION OF MILK [1]

WHERE CONSUMED	POPULATION	PER CAPITA PER DAY
Cities	48,000,000	.7 lb.
Dairy farms	32,000,000	1.5 "
Other farms and towns . . .	26,700,000	.9 "

Converting pounds of milk into pints, we find the daily per capita consumption for the city population, nearly half the population of the country, to be .64 pint. For the rural population the daily milk consumption is greater in the proportions given.

The Rochester Milk Survey,[2] which was an investigation of the milk consumption of that city in one-tenth of all the homes, covering every section and class of the city, showed that 20,422 persons consumed 4880 quarts daily, an average of .24 quart or nearly one half-pint per day. Statistics for 11 public schools, numbering 10,025 children, show that only 60.2% drink milk. A comparison with standards reveals the fact that the city of Rochester consumes only half the amount of milk necessary for good health.

Sherman and Gillett [3] calculated that 57% of the total calcium intake of 92 families was obtained from milk and cheese in spite of the fact that 57% of the dietaries were deficient in calcium.

The Market Reporter [4] gives a table which shows how the total milk product is utilized in our country.

The dairy products furnish 27.5% of the total fat in human foods. Of this amount 37% is in the form of butter. Butter therefore furnishes 10% of the total fat consumed by our people, which puts it on a basis of equality with oils and beef as a source of fat. Butter is a particularly palatable form of fat but relatively expensive. From the point of view of nutrition, margarine and vegetable and

[1] United States Bureau of Markets; *The Market Reporter*, 389, June 19, 1920.
[2] Rochester Public Safety Committee; *Report of Rochester Milk Survey.*
[3] SHERMAN, H. C., and GILLETT, L. H. — *Adequacy and Economy of Some City Dietaries*, 15.
[4] United States Bureau of Markets; *The Market Reporter*, 389, June 19, 1920.

TABLE VI

UTILIZATION OF MILK IN 1919

PRODUCT	MILLION POUNDS	PER CENT OF TOTAL MILK USED
Household purposes	38,619	43
Creamery butter	18,375	20
Dairy butter	14,385	16
Cheese	4,200	5
Condensed milk	4,813	5
Ice cream	3,450	4
Feeding calves	3,500	4
Waste	2,500	3
TOTAL	89,842	100

animal fats may be substituted. The canned-milk industry and the manufacture of oleomargarine have grown considerably in the last decade, and they will gradually reduce the production of butter. From 1916 to 1919 the average per capita consumption of margarine increased from 1.95 to 3.32 pounds. The important conclusion from these data, as far as the schools are concerned, is the necessity of preventing the reduction of the amount of raw milk consumed.

TABLE VII

PER CAPITA CONSUMPTION OF BUTTER AND MARGARINE [1]

YEAR	BUTTER (POUNDS)	MARGARINE (POUNDS)
1909	17.67	1.23
1914	16.60	1.42
1916	14.86	1.95
1917	15.25	2.81
1918	14.63	3.35
1919	14.51	3.32

Cheese is the most highly concentrated protein food. It consists roughly of equal parts of protein, fats, and water. It has

[1] Report of the U. S. Federal Trade Commission on Milk and Milk Products, 76; 1921.

twice as much protein, pound for pound, as beef, and its fuel value is twice as great. The per capita consumption of cheese is 4 pounds [1] per year while the per capita consumption of meat is over 180 pounds per year. Four-fifths as much milk is used to manufacture ice cream as is used to make cheese. A study of the actual food habits of 273 workingwomen in Boston,[2] living away from home, showed that they ate cheese less than once in two weeks.

Experiments conducted by the Department of Agriculture disprove the common assumption that raw cheese is a cause of digestive disturbances.[3] The report inclines toward the belief that cooked cheese also is not a cause of digestive disturbances, though experimentation on this point has not been sufficiently extensive to be conclusive. Studies made by the States Relation Service demonstrated that cheese may be effectively combined with olives, green peppers, pickles, different kinds of nuts, various vegetables, and nearly all fruits.

It has been shown that cheese is enormously underconsumed, that it is a rich food, and that it is an economical substitute for meat. It has been demonstrated that cheese is digestible and that it blends effectively with several savory fruits and vegetables. The duty of the curriculum-maker is, clearly, to introduce such content as will increase the consumption of cheese.

Objectives Concerned with the Consumption of Milk and the Dairy Products

To form the habit of drinking milk daily.
To know the nutrient value of milk.
To use butter or a butter substitute with every meal.
To know the constituents of oleomargarine and its relation to butter as a food.
To realize without prejudice the function and nature of oleomargarine.
To draw upon milk especially as a source of calcium.
To consume more milk in the raw form.

[1] Ontario Department of Agriculture; *Bulletin 221*, 12.
[2] Eaves, Lucile — *The Food of Workingwomen in Boston*. Chapter III written by Louise Moore.
[3] Langworthy, C. F., and Hunt, C. L. — United States Department of Agriculture, *Farmers' Bulletin* 487.

To know that milk contains all the important nutrients required by man.
To know the relation of milk to butter and to cheese.
To cultivate the habit of eating more cheese.
To know the specially high food value of cheese.
To correct the impression that cheese is difficult to digest.
To know the relative cheapness of cheese.
To know the fruits and vegetables with which cheese combines effectively.
To know the relation of raw milk to evaporated milk, condensed milk, and ice cream.
To know the nutritive functions of milk, butter, cream, condensed milk, evaporated milk, cheese, and ice cream.

The Consumption of Meat

Every general study of the food habits of the people indicates that as a nation we eat too much meat. Gephart and Lusk [1] quote a table of per capita meat consumption in Europe which is followed by a figure of American meat consumption. The comparison shows that the people of our nation eat an excessive amount of meat.

Table VIII

PER CAPITA CONSUMPTION OF MEAT IN EUROPE AND AMERICA

Country	Per Capita per Year in Pounds
Italy	23
Russia	59
Austria-Hungary	64
France	74
Belgium, Holland	75
England	105
Germany	115
United States [2]	187

The kinds of meat which the people of our country consume are given in the following table.[2] Pork and beef comprise 96.6% of all the meat consumed. These meats therefore should receive special attention in the study of foods.

[1] Gephart, F. C. — *Analysis and Cost of Ready-to-Serve Foods*, 11.
[2] United States Department of Agriculture; *Monthly Crop Reporter*, February, 1921.

TABLE IX

PER CAPITA CONSUMPTION OF MEAT, 1919

KIND	POUNDS PER CAPITA	PER CENT OF EACH KIND
Pork	100.1	53.6
Beef	80.0	43.0
Mutton and lamb	6.4	6.4
TOTAL	186.5	100.0

In the studies of food budgets of workingmen's families not one showed that less than one-quarter of the total expenditures was for meat. In most budgets the meat item approaches one-third of the total food bill. The lower the income, relatively, the more is spent for meat, which is an expensive form of protein food. The greater the expenditure for meat, the less is the total nutritive value of the dietary. The 2567 families reported by the United States Bureau of Labor Statistics spent 31.4% of the total food cost for meat. The Italians as a nation consume little meat, but show no marked departure from the general consumption of the necessary food elements.

Here, again, we have a national problem, one which from the point of view of absolute and comparative standards is distinctly peculiar to our nation. It will not be enough for our schools to create a cry against meat. The modification of the present habits of consuming meat must conform to a sound organization of knowledge and habits with respect to the whole process of food consumption. The first attack on this problem is by way of recognizing food content seriously in the curriculum.

The various cuts of beef, veal, mutton, lamb, and pork vary in food value and in price. Intelligent selection of meat is impossible without this knowledge. The following table [1] gives the relative cost of several cuts of beef and the relative nutritive value of these cuts.

[1] SHERMAN, H. C. — *Food Products*, 207 f. (Table by Hall and Emmett), also 411.

TABLE X

RELATIVE WHOLESALE COST OF CUTS OF BEEF

CUT	WHOLESALE COST PER POUND OF LEAN IN CUT	PER CENT PROTEIN IN LEAN
Loin	31.6	19.7
Rib	27.1	19.6
Round	17.8	21.3
Chuck	13.7	19.2
Plate	15.8	15.6
Flank	22.0	20.8
Fore shank	10.5	22.0

In 1918 the nation consumed more meat than in the preceding years. The total meat bill for the nation, however, was lower than that of the preceding years. The exports of meat were two-and-a-half times as much as those of the pre-war years. "In export the better class of beef carcasses are required as well as concentrated canned beef so that the remainder for home consumption represents the poorer classes of meat." [1] At home, the cheaper cuts were consumed. This made it possible for families to purchase more meat for less money and it left a large excess for export. It should be observed that this took place during the period of the World War. The people of the nation were forced into habits of economy by conditions which they could not control. The problem of food education is to train the coming generations of consumers to use the less expensive cuts of meat voluntarily.

The great mass of people can buy the expensive cuts of meat only rarely. They should know that there are several palatable foods which perform the same dietary function as meat, furnish protein as effectively and in most cases more economically. Milk, eggs, beans, peas, cheese, nuts, fish, are rich in protein and may replace meat in the diet. The following table [2] shows five common foods which can replace meat for a smaller expenditure.

[1] CHASE, STEPHEN — *Production of Meat in the United States*, 58; United States Food Administration, 1919.

[2] United States Food Administration; *The Day's Food in War and Peace*, 21, 22, 54.

TABLE XI

QUANTITY AND COST OF SEVERAL FOODS YIELDING ONE OUNCE OF PROTEIN

FOOD	QUANTITY	COST IN CENTS (PRICES OF 1917)
Milk	1 quart	.13
Eggs	4	.15
Cheese	¼ pound	.095
Dried navy beans	6 ounces	.05
Fish	7 ounces	.052
Meat	7 ounces	.15

Although the United States as a nation consumes an overabundance of meat, it is comparatively low in fish consumption. The table below shows the place which the United States occupies as a consumer of fish. Fish is considerably cheaper than meat. Pound for pound, fish is as nourishing as meat; yet it is said that every year the fishermen of the Atlantic Coast throw away about 10,000,000 pounds of fish that have a higher nutritive value than cod. It should be the purpose of the school to help to increase the use of fish as a protein food.

TABLE XII

COMPARATIVE PER CAPITA CONSUMPTION OF FISH

COUNTRY	POUNDS
England	65
Canada	57
United States	18
Belgium	17
France	14

Objectives Concerned with the Consumption of Meat

To become aware of the unusually excessive per capita consumption of meat in the United States.

To know the function of pork, beef, mutton, lamb, and veal in the diet.
To know that pork is especially rich in fats.
To identify the chief cuts of beef, veal, mutton, lamb, and pork and to know their most appropriate uses.
To know the relative food value of the various cuts of beef, veal, mutton, lamb, and pork.
To cultivate the habit of buying the most economical cuts.
To know that the function of meat in the diet can be served by meat substitutes.
To spend less money on meat.
To cultivate the habit of buying less meat.
To know that meat is the most expensive protein food.
To know in terms of weight just how much meat is sufficient for each member of the family.
To use milk, eggs, beans, peas, cheese, nuts, and fish instead of meat.
To consume more fish.
To know the relative value of meat and fish as protein foods.
To know that the total food bill increases as the expenditure for meat increases.
To know that the greater the expenditure for meat in the diet, the less is the total nutritive value received.

The Consumption of Vegetables

Vegetables are of first importance in the supply of calcium, iron, and phosphorus, food constituents that are essential elements of the bone and muscle, and that in addition help to regulate the functions of muscles, nerves, and internal fluids. The green vegetables are rich in vitamines, which are essential to the healthy growth of the bone tissue and to the maintenance of a healthy nervous condition. In spite of this, every comparison recorded early in this chapter shows a lack of vegetables in the diet of the American people. According to Pearl,[1] the green vegetables comprise 3.8% of the nation's total intake of food by weight and 2.01% by caloric value. If we accept Pearl's figures, which represent the habits of the whole nation, we discover that the nation eats one-third of the quantity of green vegetables that is required

[1] See Tables I and III.

for wholesome living. Since the green vegetables are rich in mineral salts, the lack of phosphorus, calcium, and iron reported by Sherman and Gillett, and Phillips and Howell [1] confirms the lack of green vegetables in the American diet.

It is impossible to give direct and final data to show exactly what vegetables the American people eat. What data we have, however, will show sufficiently the relative consumption of the chief vegetables. The United States Bureau of the Census presents the most significant figures [2] pertaining to vegetables raised on the farms of the country. The table which is given below to represent the habits of the American people with respect to the consumption of vegetables does not classify those raised on farm gardens for home use, the value of which was 27% of the total of farm vegetables. It is fair, however, to assume that the vegetables consumed by the farm households will parallel roughly the vegetables raised by farmers for sale. The position of beans and peas in the table is lower than it actually appears in the American dietary because the table does not list dried beans and peas nor does it take into account the imports of dried peas, which in 1919 amounted to 70% of the value of green peas. It should be remembered, furthermore, that vegetable consumption varies with locality and dietary customs. Therefore, the conclusions should be considered in the light of the special needs of the group to which these data are applied.

The leading vegetables consumed in this country are, in order: potatoes, sweet potatoes, tomatoes, cabbages, onions (dry), cantaloupes, watermelons, celery, cucumbers, lettuce, beans, peas, asparagus, green peppers, spinach, and carrots. These are given in the following table, followed by their respective food values and costs. Thus we have a picture of what the consumption habits of our people are and their defects with respect to selection for maximum food value and for economical purchase. The outstanding deficiency is the low consumption of spinach which, all things considered, ranks first in food value and is the least expensive of the vegetables. Here is a vegetable which indisputably

[1] See Table IV.
[2] United States Bureau of the Census; *Fourteenth Census of the U. S.*, V, 811–831.

should become a customary food in the diet of workingmen. Tomatoes furnish comparatively little food value and yet are third in quantity of all farm vegetables produced. Families of low and moderate income should adapt the Italian practice of using tomato for flavoring. It should be remembered that potatoes are about one-fifth starch and should be considered as having the same function in the diet as the grains. Similarly the great mass of people must come to consider the green vegetables as having an essential function, that of furnishing the salts of calcium, phosphorus, and iron, without which perfect health is impossible. The outstanding conclusions with respect to defects in the economical purchase of vegetables are that sweet potatoes are bought a little out of proportion to their cost and that celery is expensive and should be used more sparingly. Beans and peas appear to be expensive by weight but their large return in food value makes them a cheap food which should be consumed in larger quantities.

Dried beans and peas, belonging to the general class of foods called legumes, should be classified by our population not as vegetables but rather as foods rich in protein. They should take the same place in the food scheme as meats. The legumes comprise less than one per cent of the caloric intake, though they have a higher composite food value than any other article of food except cheese. In addition, they are rich in calcium and iron.

That legumes serve as an excellent substitute for meat is shown by their extensive use among peoples who eat little or no meat. The Mexicans, who eat little meat, use the native bean, *frijole*, at every meal. The Asiatic peoples use lentils as the chief protein food. Italian laborers eat kidney beans daily and depend upon them for protein.[1]

Of the vegetables given in the following table it should be remembered that a large portion of the beans, peas, and tomatoes are consumed as canned goods. The purchaser of canned goods should know the effect of canning on price and nutrition of beans, peas, and tomatoes, which are the chief products of the vegetable

[1] Abel, M. H. — *Beans, Peas, and Other Legumes as Food*, 22, United States Department of Agriculture (Farmers' Bulletin 121).

canning industry.[1] The commercial canning of vegetables at the present time, however, is comparatively small. The value of vegetables as produced in cans is 13% of the total value of all vegetables produced on farms.

TABLE XIII

RELATION OF QUANTITY OF VEGETABLES CONSUMED TO FOOD VALUE AND PRICE

	Value of Products Thousand Dollars[2]	Rank	Composite Food Value[3]	Rank	Price per Pound (cents)[4]	Rank
Potatoes	639,441	1	414	4	4.0	2
Sweet potatoes	124,844	2	374	5	8.0[5]	6
Tomatoes	38,675	3	192	11		
Cabbages	21,848	4	367	7	5.0[5]	3
Onions (dry)	21,387	5	295		6.0	4
Cantaloupes	10,767	6				
Watermelons	10,466	7				
Celery	9,462	8	350	8	15.0	10
Cucumbers	8,579	9	153	12		
Lettuce	8,535	10	299	10	7.0	5
Beans (green)	8,031	11	472	3	10.0	8
Peas (green)	7,165	12	475	2	10.0	9
Asparagus	5,102	13	368	6		
Peppers (green)	3,079	14				
Spinach	1,716	15	810	1	3.3	1
Carrots	1,563	16	338	9	8.0	7

Objectives Concerned with the Consumption of Vegetables

To give the vegetables their proper place in the thinking and habits of the food plan of the people of our nation.

To use and to think of potatoes primarily as starch foods.

To use and to think of the green vegetables primarily as foods rich in calcium, phosphorus, and iron salts.

[1] United States Bureau of the Census; *Fourteenth Census of the U. S.*, X, 62–82.

[2] United States Bureau of the Census; *Fourteenth Census of the U. S.*, V, 811–831.

[3] Sherman, H. C., and Gillett, L. H. — *Adequacy and Economy of Some City Dietaries*, 25. The composite value was obtained by assigning 40 points to energy and 15 each to protein, phosphorus, calcium, and iron. The emphasis here is on mineral salts.

[4] United States Food Administration; *The Day's Food in War and Peace*, 21, prices of July, 1917, New York City.

[5] Quoted from *The American Food Journal*, XII, 358, July 1, 1917.

To use and to think of the legumes as rich in protein foods, with an abundance of calcium and iron.

To cultivate the habit of using spinach as a rich and cheap food.

To use tomatoes less in bulk and more for flavoring.

To use more dried beans and peas.

To know roughly the relative cost and food value of:

potatoes, sweet potatoes, tomatoes, cabbages, onions, cantaloupes, watermelons, celery, cucumbers, lettuce, beans, peas, asparagus, green peppers, spinach, and carrots.

To know the effect of home and commercial canning on beans, peas, and tomatoes.

The Consumption of Fruits

The primary function of fruits in the diet is to furnish the mineral salts which build the body tissue and nourish body fluids. The fruits, also, are rich in carbohydrates, thus yielding energy without exaggerating the consumption of protein and fat. The absence of fruit in the diet when not balanced by vegetables or milk is likely to result in physical deficiency.

The present habits of our people with respect to the consumption of fruit are even more negligent than they are with respect to the consumption of vegetables. The sum total of all fruits consumed is a little over two per cent of the total food intake measured in terms of calories. The only fruits which appear at all as food products of any importance are apples, bananas, and oranges, yielding respectively 1.08, .40, and .11 per cent of the nation's food energy.

The chief fruits which the people of our nation eat are apples, grapes and raisins, peaches, oranges, strawberries, pears, plums and prunes, bananas, apricots, currants, cranberries, figs, dates, lemons, and pineapples. The following table shows the relation between the quantity of fruits consumed and their food value. The apple ranks first in quantity and last in food value but its cheapness accounts for its wide consumption. Peaches and oranges are consumed out of proportion to their food value. Figs and dates, which have the highest composite food value, are con-

sumed least. Raisins and prunes should become known as foods particularly rich in iron, which nourishes the blood.

Among the fruits there are several which should become known especially for qualities other than their abundance in mineral salts and acids. The banana should come to be regarded as a starch food, such as the potato and rice. The dried fruits are rich in carbohydrates and should be classified in the food scheme of the people with the starchy vegetables and cereals.

TABLE XIV

RELATION OF QUANTITY OF FRUITS CONSUMED TO FOOD VALUE

KIND	VALUE OF PRODUCTS CONSUMED IN 1920[1] (DOLLARS)	RANK	COMPOSITE FOOD VALUE[2]	RANK
Apples	241,911,000	1	156	12
Grapes	102,344,000	2	266	5
Peaches	96,000,000	3	177	11
Oranges	58,039,000	4	228	9
Strawberries	38,000,000	5	355	3
Pears	24,798,000	6	228	10
Plums and prunes	20,962,000	7	337	4
Bananas	19,088,000	8	236	7
Apricots	9,700,000	9		
Currants	6,076,000	10		
Cranberries	5,700,000	11		
Figs	4,883,000	12	1782	1
Dates	2,088,000	13	1240	2
Lemons	1,717,000	14	228	8
Pineapples	1,423,000	15	253	6

The dried fruits comprise about 16% of the total value of fruits and fruit products on farms. The chief dried food products are raisins, prunes, peaches, apples, and apricots. Figs and dates are imported but their consumption does not reach the least con-

[1] The value of fruits consumed was obtained by subtracting the value of fruits exported from the sum of the value of fruits produced and imported. The production figures were obtained from the United States Department of Agriculture, *Weather, Crops, and Markets*, 402, May 13, 1922. The import and export figures were obtained from the United States Department of Agriculture, *Yearbook, 1921*, 740 and 746.

[2] SHERMAN, H. C., and GILLETT, L. H. — *Adequacy and Economy of Some City Dietaries*, 25. The composite value was obtained by assigning 40 points to energy, and 15 each to protein, phosphorus, calcium, and iron. The emphasis here is on mineral salts.

sumed of the American dried fruits. Considering that the food value of figs and dates ranks with raisins there is good reason why we should import and eat more of these dried fruits. The dried fruits the year round are cheaper than the fresh fruits.

The chief fruits which are canned are peaches, apricots, pears, apples, cherries, and blackberries. None of the important fruits is being canned sufficiently to make the problem of selection between canned and fresh fruits an immediate one. It is likely that canning will increase and therefore it is important for the consumer to form intelligent judgments with respect to canned foods.[1]

Objectives Concerned with the Consumption of Fruits

To know exactly what place the fruits occupy in the food plan.
To use and think of bananas as a starch food.
To use and think of the dried fruits as starch foods.
To use and think of raisins and prunes as foods rich in iron.
To consume more figs, dates, raisins, and prunes.
To know the relation between fresh and dried fruits as well as their comparative quality and economy.
To know the relation between fresh and canned fruits as well as their comparative quality and economy.
To know roughly the relative food value and cost of apples, grapes, peaches, oranges, strawberries, pears, plums, prunes, bananas, apricots, currants, cranberries, figs, dates, lemons, and pineapples.

The Consumption of Cereals

The cereals contribute more than any other one group to the food of the great mass of people. They occur in food as the kernels of corn, oats, rice, rye, and wheat; as flours, meals, breakfast foods, and starches; and as bread, crackers, cakes, and pastry.

The cereals are primarily starchy foods and are consumed to furnish the requirement of carbohydrates in the diet. However, in addition, they supply a large portion of the protein in the American diet. Indeed, the cereals stand first in the contribution of carbohydrates, proteins, and calories — 56% of the carbohydrates, 36% of the protein, and 35% of the energy in the nation's

[1] United States Bureau of the Census — *Fourteenth Census of the U. S.*, X, 62–82.

food are derived from the grains.[1] It is the cereals that make it possible for our large wage-earning population to subsist. The food studies which have been made show that the total cost of the dietary decreases as the amount expended for cereals increases.

The chief cereals are wheat, corn, rice, rye, oats, and barley. Of these, wheat is of greatest importance to the nation as human food. The average consumption of wheat for the years 1911 to 1917 was 25.9% of the total food intake. Corn furnished 7.03%, rice .6%, rye .45%, and all other cereals .69% of the total intake of human foods.

The grain products are about equal in nutritive value. Oatmeal is an exception. It is comparatively high in carbohydrates, proteins, fats, and mineral salts. Until 1918 not more than 2% of the oat supply of the country was milled for use as food. Since then the consumption of oats has increased somewhat. Corn meal has a higher composite value than fine wheat flour and is the least expensive of the cereals. The supply of corn meal can be increased up to about ten times the amount now milled without necessarily increasing the amount of land devoted to corn raising.[2] About 10% of the entire corn crop is used for human consumption; the rest is consumed by animals. Both corn meal and oats and their products are the least expensive of the cereals and since they may be depended upon for a large portion of the total food intake they can serve to reduce the cost of food.

Whole-wheat flour is richer in protein and mineral salts than fine wheat flour. Wheat loses half its calcium and five-sixths of its iron in the milling process. The removal of calcium and iron from wheat is a serious procedure because of the importance of these elements to physical well-being and because of the abundance of wheat products which are consumed.

Objectives Concerned with the Consumption of Cereals

To know the function of the cereals in the diet.
To know the forms in which cereals occur and to recognize them as such.

[1] Pearl, Raymond — *The Nation's Food*, 225 f.
[2] Sherman, H. C. — *Food Products*, 255.

To know that the cost of food can be decreased by increasing the amount of cereals in the diet.

To know the relative value and economy of the several cereals and cereal products.

To know the special value of oatmeal as a carbohydrate and protein food.

To increase the consumption of oatmeal and corn meal.

To know the special value of whole-wheat bread and to increase its consumption.

To know roughly the relative food value and cost of wheat, corn, rice, rye, barley, oats, and their products.

TABLE XV

RELATION OF QUANTITY OF GRAINS CONSUMED TO FOOD VALUE AND PRICE

KIND	PER CENT OF TOTAL CALORIES CONSUMED[1]	RANK	COMPOSITE FOOD VALUE[2]	RANK	COST OF 100[3] CALORIES IN CENTS	RANK
Wheat . . .	25.90	1	1372	6	.48	4
Corn . . .	7.03	2	1444	4	.34	1.5
Rice . . .	.60	3	1289	5	.66	6
Rye	.45	4	1502	3	.45	3
Barley . . .	.69	5	1513	2	.57	5
Oats, etc. .		6	2245	1	.34	1.5

THE CONSUMPTION OF COFFEE, TEA, AND COCOA

Coffee and tea contribute nothing to nutrition. Cocoa, according to Sherman, consists of 21.6% protein, 28.9% fat, 37.7% carbohydrate, and has an energy value of 2258 calories per pound.

The present consumption of cocoa is .29% of the total calories consumed. Generally speaking, cocoa occupies a negligible position in the diet of our nation in spite of its rich food value and palatability. Our studies (Table II) show that workingmen's families

[1] PEARL, RAYMOND — *The Nation's Food*, 236. The figure gives the average consumption of grains in the United States in terms of calories for the period 1911–1917.

[2] SHERMAN, H. C., and GILLETT, L. H. — *Adequacy and Economy of Some City Dietaries*, 25. The composite value was obtained by assigning 60 points to energy and 10 points each to protein, phosphorus, calcium, and iron. The emphasis here is on caloric consumption.

[3] *The American Food Journal*, XII, 306, June, 1917. Barley here signifies pearl barley and oats signifies rolled oats in bulk. The prices for the other cereals are for flour and meal.

spend 4.25% of the food bill for coffee and tea. The great mass of our people honestly believe that coffee and tea are cheap foods and consume them abundantly for that reason. The per capita consumption per year of coffee and tea is 12.78 pounds and .84 pound respectively.[1] The per capita consumption of cocoa in 1917, based on Pearl's figures, was 3 pounds per year. The rapid increase in consumption of cocoa in the six years from 1911 to 1917 is evidence of the growing recognition of cocoa as a food. The consumption of cocoa rose from 57,438 thousand metric tons in 1911 to 141,766 thousand metric tons in 1917.

Objectives Concerned with the Consumption of Coffee, Tea, and Cocoa

To know that coffee and tea contribute nothing to nutrition.
To know that cocoa is rich in protein, fat, and carbohydrates.
To increase the consumption of cocoa.

Relation of Selection to Cost of Food

It has been shown that a large proportion of the population of our country have inadequate incomes and therefore must buy judiciously in order to extract from their food the required nutrition. The table of caloric consumption of foods furnishes conclusive evidence of money waste in the selection of foods for the American dietary. The fats and meats, which are relatively high in cost, are consumed in excess of the standard. The legumes and potatoes, which are relatively low in cost, are underconsumed.

The range of costs of food necessary to meet the requirements of bodily energy, growth, and general health is very wide. During the war the United States Food Administration published and distributed a circular [2] giving the relative cost of a given number of calories of the chief food commodities. By comparing the actual consumption of food in terms of calories as studied by Pearl [3] with the table of comparative cost of food, it is possible

[1] United States Bureau of Foreign and Domestic Commerce; *Statistical Abstract of the United States*, 560; 1920.
[2] United States Food Administration; *The Day's Food in War and Peace*, 21–22.
[3] Pearl, Raymond — *The Nation's Food*, 236.

to discover exactly where the extravagance in food purchase lies. Wheat, being very near the lowest relative cost, is properly the largest item of consumption. If it were not for wheat, the large mass of low-income families would suffer from serious lack of food, for the more grain products consumed the less expensive is the dietary. This observation is supported by the study of Sherman and Gillett,[1] who show that the group which spent 41.8% per person per day got 72 calories for every cent spent, while the group which spent 25.2¢ per person per day got 108 calories for every cent.

TABLE XVI

RELATION BETWEEN THE AMOUNT CONSUMED OF THE CHIEF FOOD COMMODITIES AND THEIR COST

ITEM	PERCENTAGE CONSUMPTION IN TERMS OF CALORIES, 1917–1918	RANK	RELATIVE COST OF 100 CALORIES, BREAD = 100	RANK
Wheat	21.94	1	53	2
Dairy products	15.36	2	245	16
Pork	15.05	3	366	17
Sugar	13.11	4	68	5
Corn	7.99	5	51	1
Beef	5.13	6	681	19
Potatoes	3.99	7	149	12
Oils	3.77	8	103	7
Poultry and eggs	1.94	9	756	20
Nuts	1.65	10	103	8
Cereals	1.41	11	55	4
Vegetables	1.39	12		
Legumes	1.20	13	117	10
Rice	1.01	14	96	6
Rye	.95	15	54	3
Apples	.88	16	180	14
Oleomargarine	.86	17	122	11
Other fruit	.73	18		
Cocoa	.50	19	166	13
Mutton	.40	20	473	18
Fish	.39	21	800	21
Bananas	.31	22	108	9
Oranges	.07	23	221	15

[1] SHERMAN, H. C., and GILLETT, L. H. — *The Adequacy and Economy of Some City Dietaries*, 13.

Milk and its products appear to be relatively expensive but the composite value of milk would tend to reduce its relative cost. Pork and beef are largely consumed but are high in cost. Sugar is a cheap food but may be consumed only to a limited amount. Corn is fifth in order of consumption and first in order of cheapness. Cereals other than corn and wheat are inexpensive but are consumed very little. Legumes are low in cost of calories and much lower in cost when their composite food value is considered. Rice is cheap but furnishes only one per cent of the calories. Cocoa, like legumes, is very high in composite food value but is consumed to an almost negligible amount.

A further test of the economic habits of food selection is the relation between the actual amount of money spent for food by the family and the return for the money in food value. For this purpose the average weekly cost of food of 1036 American-British families, reported in Senate Document No. 38, was used. The data were compared with Sherman and Gillett's table of composite food values, which expresses the combined protein, caloric, and mineral value of each food. The comparison (TABLE XVII) indicates that meats rank first in amount expended and twelfth in food value. Eggs are high in amount expended but relatively low in composite food value. More is spent for coffee and tea than for fruits and jams and exactly as much as is spent for green vegetables. Cheese commands very little expenditure but is first in combined nutritive value. Oatmeal stands twentieth in amount expended and seventh in food value. Little is expended for peas and beans although they are third in order of nutritive value. The same is true of cocoa.

In a preceding section we compared actual with standard expenditures for foods and found that disproportionate amounts were spent for dairy products, meats, coffee, and tea. Here we discover directly the cause of these and other discrepancies in food expenditure. The relative cost of foods and their relative nutritive values are rarely learned in the daily routine of home management. It is therefore important that they be taught in the school.

TABLE XVII

RELATION BETWEEN AMOUNT EXPENDED AND COMBINED FOOD VALUE

ITEM	AVERAGE WEEKLY COST 1036 FAMILIES	RANK	COMPOSITE FOOD VALUE	RANK
Bread, wheat	$.42	5	1098	20
Bread, rye	.05	25	1125	19
Flour, wheat	.35	8	1372	15
Flour, rye	.01	34	1502	13
Flour, buckwheat, etc.	.02	31	1125	18
Maize and maize meal	.03	30	1444	14
Cakes, crackers, etc.	.21	12	1579	10
Rolls, buns	.14	15	1098	21
Macaroni	.05	24	1502	11
Rice, barley	.08	21	1289	17
Oatmeal	.09	20	2245	7
Potatoes	.36	6	377	28
Sweet potatoes	.03	29	399	27
Peas and beans, dried	.07	22	2639	3
Sweet corn (canned)	.04	26	497	26
Green vegetables	.36	7		
Canned vegetables	.13	17		
Meat	1.88	1	1500	12
Fish	.15	14	1310	16
Lard	.18	13	2450	4
Butter	.55	2	2320	6
Oleomargarine	.01	32		
Olive oil	.01	33	2449	5
Cheese	.09	18	4460	1
Milk, fresh	.43	4	612	24
Eggs	.46	3	1092	22
Milk, condensed	.09	19	2005	8
Tea	.14	16		
Coffee	.22	11		
Cocoa and chocolate	.03	28	2900	2
Sugar	.26	10	1090	23
Molasses and syrup	.04	27	1978	9
Vinegar	.05	23		
Fruits and jams	.28	9	591	25

The problem of economical selection of food is especially important for the great number of people who depend upon prepared food in eating places. F. C. Gephart,[1] who studied 350 orders of food

in 46 restaurants in New York City, found that the cost of 2500 calories of food ranged from 25¢ to $14. Ignorance of the relative cost of foods under these conditions results in money waste, undereating, and overeating.

Objectives Concerned with the Relation between Selection and Cost of Food

To know the relative cost of food and the nutrients of food.
To know that the cereals are an inexpensive form of food.
To know that pork and beef are expensive foods.
To know that sugar is cheap as a carbohydrate food.
To know that corn is an inexpensive food.
To know that the legumes are inexpensive foods.
To know that cocoa is an inexpensive food.
To know that the meats give a small return in food value in relation to the money spent.
To know that eggs are an expensive food.
To know that too much money is spent for coffee and tea.
To know that cheese is an inexpensive food.
To know that oatmeal is inexpensive.
To order ready-to-serve foods in such a way as to get the most food value for the money available.

[1] GEPHART, F. C. — *Analysis and Cost of Ready-to-Serve Foods*, 18–22.

CHAPTER III

FOOD CONSUMPTION (*Continued*)

The wise selection of food is often limited by market conditions. The system of food distribution is complex, affecting the quality of foods and their price. It introduces various factors which affect economy of purchase. It makes necessary a consideration of the quantity to be purchased at one time; the form in which articles are to be purchased; the wisdom of purchasing package goods; the purchase of seasonal products; and cash or credit payment plans. Obviously the present status of marketing suggests a need for the consideration of some constructive purchasing plans. The curriculum recommendations to be made in connection with the process of purchasing food will be based upon exact data describing present practices.

Buying Food in Large Quantities

Of the important food commodities, the following may be stored by one or more methods; sugar, potatoes, dried peas and beans, flour, cereals, apples, cocoa, canned fruit and vegetables, dried fruit, coffee, condensed milk, lard, and spices. The habit of purchasing by the nickel or dime because it is a convenient unit is most wasteful. To buy small quantities at retail is wasteful too. To buy by the pound is the beginning of economy. To buy in large quantities at retail is a step further in advance. To buy wholesale for one's self or for a coöperative buying club is most economical. The retail and wholesale price of the following commodities from the *Monthly Labor Review* for December, 1921, are examples of the relative cost of small and large quantity purchases of goods which may be stored. If the consumer bought sugar, potatoes, flour, and evaporated milk in large units direct from the wholesaler, he would save, according to the figures below, from 30 to 70% on his purchases.

TABLE XVIII

WHOLESALE AND RETAIL PRICE OF FOUR FOODS, 1921

	RETAIL	WHOLESALE
Sugar per pound	$.065	$.05
Potatoes per pound	.031	.018
Wheat flour per pound	.050	.035
Evaporated milk per can	.127	.086

Alexis L. Clark [1] of the New Jersey State Department of Agriculture reports that "numerous groups of people, especially in the large office buildings, buy 50 to 200 pounds of butter each week direct from a creamery." A number of carloads of potatoes, oranges, and apples are bought each fall by women's organizations in the cities of New Jersey.

Objectives Concerned with Buying in Large Quantities

To buy in large quantities foods which can be stored, such as: sugar, potatoes, flour, cereals, dried fruit, dried vegetables, canned fruit and vegetables, cocoa, coffee, condensed milk, and lard.

To discontinue the practice of purchasing for small coins.

To discontinue the practice of buying small quantities or fractions of a a measure.

To buy goods through buying clubs.

To ascertain the difference in wholesale and retail prices of the chief food commodities.

To purchase wholesale those commodities on which there is the largest advantage over retail purchases.

BUYING FOOD IN PACKAGES

Of the important food commodities the following may be bought in packages and containers or in bulk: milk, cereals, sugar, butter, cocoa, tea, coffee, cake and crackers, spices, fruit, and vegetables. That packages increase the cost of food articles is obvious, for

[1] New Jersey Department of Agriculture; *Bulletin No. 7*, 231.

paper, printing, and labor must be paid for by the consumer. The following table [1] gives the actual difference in retail price between foods bought in bulk and in package in July, 1917. The average excess cost of food bought in packages over the cost of food bought in bulk of the 11 articles investigated was 54.01%. The policy which a family should follow in this matter is to buy goods in bulk whenever it is possible.

TABLE XIX

DIFFERENCES IN RETAIL PRICE BETWEEN FOOD BOUGHT IN PACKAGE AND IN BULK, JULY, 1917

KINDS OF GOODS	PRICE PER POUND, BULK	PRICE PER POUND, PACKAGE	EXCESS OF PACKAGE OVER BULK	PER CENT EXCESS
Graham flour	9.5	10.0	.5	5.3
Rye flour	7.5	9.0	1.5	20.0
Corn meal	6.5	10.0	3.5	54.0
Oat meal	10.0	10.4	.4	4.0
Rolled oats	5.25	8.0	2.75	55.0
Macaroni	6.25	16.0	9.75	156.0
Soda crackers	22.0	30.0	8.0	36.4
Oyster crackers	20.0	30.0	10.0	50.0
Shredded cocoanut	30.0	50.0	20.0	66.7
Cocoa	25.0	45.0	20.0	80.0
Tapioca	15.0	25.0	10.0	66.7
AVERAGE				54.01

Concerning the purchase of milk L. D. H. Weld [2] reports that 48.4% of the entire amount of milk distributed in New Haven is sold at retail in bottles; 31% is sold wholesale in bottles; 20.6% is sold wholesale in cans. The milk sold at retail in bottles is practically all delivered to families. The Rochester Milk Survey [3] reports that 74% of the milk supply is sold at retail in bottles; 15% is sold at wholesale in bottles; and 11% is sold at wholesale in cans.

[1] *The American Food Journal*, XII, 606, November, 1917. Information secured by W. T. SHERER.

[2] WELD, L. D. H. — *Marketing Survey of New Haven*, 40.

[3] Rochester Public Safety Committee — *Report of Milk Survey*, 6.

Van Arsdale and Monroe found that buying bread by the package instead of by weight was a very indefinite business.[1] A study of 105 purchases in 20 sections of New York City showed that the price of bread of the same quality varied from 7¢ to 14¢ a pound.

The cost of sugar bought in packages in relation to the cost of sugar bought in bulk is given in a study[2] made by the United States Bureau of Labor Statistics. The two-pound carton and the two-pound bag are most expensive. The price of the small packages increases as the size decreases.

The most widely consumed form of package goods is canned food. The chief commodities which are canned are: corn, peas, tomatoes, beans, peaches, pineapples, condensed and evaporated milk, salmon, and sardines. The chief items of cost in canning are raw material, packages, conversion, and overhead. The cost of the package in 1917[3] was greater than the cost of raw materials in the canning of corn, tomatoes, peas, string beans, pears, and peaches. The figures are as follows:

TABLE XX

ITEMS OF COST OF PRODUCING CANNED GOODS, 1917

ITEM	COST OF MATERIALS, PER CENT	COST OF PACKAGE, PER CENT	COST OF CONVERSION, PER CENT	COST OF OVERHEAD, PER CENT
Corn	32	38	15	15
Tomatoes	37	41	14	8
Peas	29	37	17	17
String beans	25	42	21	12
Pears	33	39	20	8
Peaches	32	37	24	7

There are certain common facts about containers which the consumer ought to know. One ought not to be left to pick these facts up accidentally or perhaps never to become aware of them

[1] VAN ARSDALE, M. B., and MONROE, DAY — *Food Education and the Community*, 426; *Teachers College Record*, XXII, 420-427.

[2] United States Bureau of Labor Statistics — Bulletin No. 121, *Sugar Prices from Refiner to Consumer*, 20 f.; 1913.

[3] Federal Trade Commission — *Report on Canned Foods*, 1918; 34–35.

at all. For example, there are containers which are similar in appearance having nearly but not quite the same volume. Peach baskets come in 14 and 16 quart measures.[1] Round stave baskets measure $\frac{7}{8}$ bushels and 1 bushel. Lettuce hampers measure 5 and 6 pecks. There are about fifty common types of hampers and over twenty sizes of round stave baskets.

A federal law passed by Congress in 1915 established a standard barrel for the measurement of fruits, vegetables, and other dry commodities, which has a head diameter of $17\frac{1}{8}$ inches and an outside bulge circumference of 64 inches. The standard baskets for small fruits, berries, and vegetables, established by federal law in 1916, are the dry half-pint, the dry pint, the dry quart, or multiples of the dry quart.[2] All food packages are required by law to be marked with the net contents in weight, measure, or numerical count.

Objectives Concerned with Buying Food in Packages

To ascertain what package goods may be bought in bulk.
To ascertain the actual difference between food bought in bulk and food bought in packages.
To purchase milk in bulk.
To buy bread by the pound.
To check up the cost of bread when bought by the package.
To know the loss in money in purchasing sugar in small cartons.
To ascertain the difference in cost between fresh and canned goods.
To ascertain the intrinsic value of food bought in cans.
To know that peach baskets, round stave baskets, and lettuce hampers are made in varying sizes which are similar in appearance but which differ in volume.
To check up the contents of peach baskets, round stave baskets, and hampers.
To know the federal law establishing a standard barrel for fruits and vegetables, and a standard basket for small fruits.
To know that all food packages are required by law to be marked with the net contents.

[1] United States Bureau of Standards; *Miscellaneous Publications 43*, 1921.
[2] United States Bureau of Standards, Circular No. 70; *Materials for the Household*, 232 f.

Making Purchasing Adjustments to Seasonal and Price Changes

The price of some food commodities, such as fresh fruit, vegetables, and eggs, varies with the seasons which determine the supply of such articles of food. A study[1] of prices of fresh eggs for the twelve months of the years 1913–1919 shows that prices run parallel for this commodity during the same seasons. Fresh eggs are cheapest in the spring and rise in price as the seasons go on. It is important that the consumer should know this in order to form the proper habit of substituting a less expensive commodity which will perform the same nutritive function.

The prices of some articles of food fluctuate and it is necessary for economic consumption to be prepared to make the desirable food substitutions. A study of the retail prices of potatoes and onions for the twelve months of 1920 and 1921[2] shows that the price of potatoes varied from 2 to 10¢ per pound and the price of onions varied from 4 to 10¢ per pound.

Objectives Concerned with Making Purchasing Adjustments to Seasonal and Price Changes

To ascertain what fruits, vegetables, and other food products vary in price with the seasons.

To form the habit of substituting a less expensive food article having the same nutritive properties for one which, during certain seasons, becomes expensive.

To buy a substitute for an article when its price changes suddenly

To know when the important foods are in season.

To buy food commodities when they are in season, in order to get fresher and cheaper food.

Buying for Cash or on Credit

The New York State Food Commission investigated the cost of operation of 128 grocery stores located in New York City.[3]

[1] United States Bureau of Labor Statistics, Bulletin No. 270; *Retail Prices*, 65 f.
[2] *Ibid.*, 66 f.
[3] New York State Department of Farms and Markets; *Retail Grocery Stores*, 1922.

The commission calculated that the consumer who trades in a well-to-do neighborhood pays $22.36 a year for delivery and credit. It was found that in poor neighborhoods only 10% demand delivery and 20% demand credit. The cost of credit and delivery service in well-to-do neighborhoods was 4.1% and in poor neighborhoods 2.5%.

The investigation of the Committee on Retail Distribution and Marketing of Goods of the American Public Health Association[1] showed that the retail price of sixteen staple foods of cash-and-carry stores averaged 17⅓ per cent less than the prices charged by the charge and delivery stores.

Objectives Concerned with Buying for Cash or on Credit

To know that delivery and credit are services which are paid for in increased cost.

To ascertain the saving incurred by purchasing at cash-and-carry stores.

Constructive Marketing Schemes

The simplification of the relations between the producer of food commodities and the consumer has not progressed very far. Public market officials and students of marketing say that it is a consumer's problem. If this is true, and in a large measure it must be true, the schools of our nation must prepare the consumer to work on this problem intelligently.

At present the consumer's interest in marketing is limited chiefly to his relations with the retail store. However, other marketing plans have been proposed and have been tried out. The consumer should become familiar with these plans as they affect the general marketing policy in his locality.

The Bureau of the Census[2] reported that in 1919 municipal markets were maintained by 127 of the 227 cities of the country having more than 30,000 inhabitants. These cities reported a total of 237 markets. Of these 174 were retail markets, 14 were

[1] *The American Journal of Public Health*, XII, 292, April, 1922.
[2] United States Bureau of the Census — *Municipal Markets*, 1919.

wholesale markets, and 49 were both retail and wholesale markets. All the available evidence indicates that, generally, these markets have been successful. In comparison with retail stores, they offer food commodities at lower prices; there is usually a larger variety on sale; and the food is fresher. The New York State Bureau of Municipal Information,[1] which made a study of the operation of municipal public markets, reports that in 30 cities the prices at the market were cheaper than retail store prices, in 16 cities the prices were about the same, and in 2 cities the prices at public markets were higher.

The Fifth Avenue Coach Company ascertained the prices of the principal foods at markets and at retail stores in New York City. It was found that the average saving on 35 common food commodities was 38%.[2]

It was not possible to ascertain the extent of the practice of buying food products directly from the farmer. The usual practice is to ship goods by parcel post, express, or by auto truck. Eggs, butter, fruits, and vegetables are commonly marketed in this way. In the survey of marketing in New Haven,[3] 14 out of 107 housewives reported that they had bought poultry, butter, maple sugar, eggs, fruits, bacon, and cheese by parcel post.

The coöperative movement, which has so thoroughly established itself among consumers in England and Russia, has developed along different lines in America. America's contribution to the coöperative movement is the coöperative marketing of agricultural products.

There were 15,000 farmers' coöperative organizations in the United States in 1920 with a membership of 2,000,000 producers.[4] In 1919 over $721,000,000 worth of farm products were sold through farmers' coöperative associations. 7.9% of our farmers sold their products in this way.[5] The movement represents a tendency toward group economy which is slowly taking hold in America.

[1] State Bureau of Municipal Information — Report No. 229, *Conference of the Mayors of the State of New York*, 1917.
[2] *The Rural New Yorker*, 1215, October 10, 1914.
[3] Weld, L. D. H. — *Marketing Survey of New Haven*, 47.
[4] University of Maryland Extension Service — *Bulletin No. 22;* November, 1920, page 10.
[5] Joint Commission on Agricultural Inquiry — *Marketing and Distribution*, 226.

As a basis for school activity it is one of the pioneering projects with which the school must experiment.

There were 2000 coöperative consumers' associations in the United States in 1919. On the Pacific Coast there is the Pacific Coöperative of about fifty societies. In Seattle there is a wholesale coöperative house through which about fifty associations operate. In East St. Louis there is a wholesale society which is the center of about eighty societies. In Superior, Wisconsin, about fifty societies operate through a wholesale house located there. A coöperative wholesale society in Pittsburgh supplies about fifty societies in western Pennsylvania, Ohio, and West Virginia. A group of societies in New England is associated with a coöperative wholesale center in Boston.

The payment of a fee is the basis of membership in these coöperative associations. Each member is allowed one vote; surplus profit is returned to members as dividends in proportion to the amount of their purchases; goods are sold at market prices. The savings which are recorded vary from 3% to 10%. Coöperative associations are recognized by law in New York State and a special department exists to encourage the establishment of coöperative consumers' societies and to render aid and advice to existing societies.

In L. D. H. Weld's investigation [1] in New Haven, 26 out of 131 families reported that they had bought coöperatively with their neighbors. The articles which were bought coöperatively in large quantities are cocoa, chocolate, canned goods, extracts, spices, sugar, cereals, nuts, raisins, eggs, flour, oranges, apples, peaches, and potatoes.

Objectives Concerned with Constructive Marketing Schemes

To become aware of the problem of marketing as it affects the consumer, with respect to quality and price of food products.

To be prepared to act politically on marketing issues.

To become familiar with the advantages and disadvantages of municipal markets.

[1] Weld, L. D. H. — *Marketing Survey of New Haven*, 47.

To compare the quality and price of food commodities bought at public markets and at retail stores.

To ascertain the advantages, if any, of buying food products directly from farmers by trucks, express, or parcel post.

To ascertain the advantages, if any, of coöperative buying.

To become familiar with the plan of the coöperative movement.

To know the effect of supply, storage, and shipment upon the price of food in a particular community.

To coöperate with dealers to improve conditions of marketing.

To urge the publication of thorough and complete market prices by the government and in newspapers.

To interpret existing market reports intelligently and to use them in connection with food purchase.

To know roughly the present schemes of grading food products.

To know the chief sources of the important foods in any community and their bearing upon quality and price.

Buying Superstitions

In New York City consumers pay high prices for white eggs and in Boston consumers pay high prices for brown eggs. Chemical tests show that no relation exists between the quality of eggs and the color of their shells. Cold-storage products are tabooed not for their intrinsic inferiority which they sometimes but not always show, but because of the early originally well-founded prejudice against cold-storage foods, which has not yet been overcome. In judging butter, its appearance and taste are given undue proportion in relation to its nutritive value. Apples are bought for their red color although some of the reddest are poor for eating purposes. The neck piece of the beef carcass is as nutritious and can be made as palatable as other cuts, yet it is considered improper to buy it. White bread is the fancy although the whole-wheat brown bread has a higher food value. Rye bread is less respectable than wheat bread. In the north, yellow corn meal is in demand; in the south white corn meal is in demand. Southern markets want yellow onions but northern markets will take red ones too.[1]

[1] Holmes, G. K. — *Consumers' Fancies*, 417–434; Yearbook United States Department of Agriculture, 1904.

These are some examples of irrational habits of food purchase which need to be improved. What is more important, however, is the evidence of popular ignorance of food consumption which they reveal.

Objectives Concerned with Buying Superstitions

To purchase foods for their intrinsic worth.
To ascertain the real value of storage products.
To overcome the unwarranted prejudice against cold-storage goods.
To judge butter primarily by its nutritive value.
To buy fruits, especially apples, for their intrinsic value rather than for their color.
To know the market names of the edible parts of the carcasses of beef, pork, mutton, and veal.
To know the relative cost of these parts.
To buy the various cuts of meat for economy and food value rather than for their reputation among the neighbors.
To buy bread for its food value and not for its color.
To buy corn meal irrespective of color.
To buy onions irrespective of color.

Storing and Preserving Food

The keeping quality of foods is dependent upon definite chemical effects. Ignorance of this fact is a cause of waste. For each food this simple chemical relation is definite and easy to learn. The conditions to be met may be the exclusion of moisture or of bacteria, the maintenance of a high or low temperature, the exclusion of light, or the action of a preservative.

If we carry out a plan of buying in bulk, in large quantities, and during periods of favorable prices, the ability to store, dry, and preserve food commodities becomes more important. In apartment houses of our large cities the opportunities for storing, drying, and preserving food are not as free as they are in the one-family detached houses of the smaller cities and towns. The apartment house lacks the large pantry, kitchen, cellar, and air space but favors the growth of bacteria, molds, and flies. For families in

apartment houses a new kind of adjustment must be made in order to increase the storing and preserving of fruit and vegetables.

An illustration of the practices in one-family houses is furnished by J. B. Leeds [1] in his study of the household budget in Philadelphia. The 60 families studied maintained a fair standard of living. Of them, 57 families preserved fruits and vegetables, 45 families canned fruits, 32 families canned vegetables, 45 families made jellies and jams, 13 families put up pickles.

The low consumption of fruits and vegetables argues for the need of employing every means of increasing their use. It is safe to assume that canning, drying, preserving, and storing articles of food have not diminished in rural districts. The existing methods of preserving fruits and vegetables must be adapted to the urban apartment conditions. The fundamental principles of canning and drying are sterilization and evaporation, both of which are universally applicable. Neither process requires machinery or implements which are not usually a part of the common household.

Marion Woodbury [2] computed the total cost of materials, jars, and fuel in home canning and compared it with the market cost of an equivalent amount of a food. She found that the cost of the home-canned product, excluding labor, was, on the average, one-third of the market cost of the same product.

Objectives Concerned with Storing and Preserving Food

To store fruits, vegetables, and cereals.
To preserve fruits and vegetables.
To dry fruits and vegetables, especially beans, peas, pears, peaches.
To store potatoes, apples, and onions in open bins or boxes.
To can corn, beans, peas, tomatoes.
To can fruit.
To preserve eggs in water glass.
To make a drier of small-mesh, galvanized wire netting.

[1] Leeds, J. B. — *The Household Budget*, 41.
[2] Woodbury, Marion — "Some Home Canning Costs for 1919"; *Journal of Home Economics*, XII, 180, April, 1920.

To use the cookstove oven for drying.
To keep insects away from food.
To pack and store dried food.

The Preparation of Food

Preparing food for the table in the past has followed traditional habits of the home. In the main these habits of food preparation have kept the race healthy. Certain common needs and defects, however, have led to the proposal of methods for the improvement of cooking practices.

The peculiar character of American life is breaking down the traditional cooking habits and is imposing modifications in the preparation of food. The adoption of an American diet by the first generation of immigrants makes necessary new adjustments. An increasing number of women are entering industrial life at at early age and are not acquiring the family cooking habits. The science of nutrition is slowly developing simple, usable cooking facts, which have penetrated into the public schools and which will begin to be applied by the present generation.

Prepared food industries are increasing. The canned foods produced increased from 63,000,000 cases in 1914 to 88,000,000 cases in 1917.[1] In the study of retail grocers in New York City, the ratio of dried vegetables to canned vegetables purchased was 1 to 6. The tendency as illustrated here seems to be away from cooking and consequently toward extravagance. The cheapest foods, beans and peas, are consumed least in their cheapest form and most in their most expensive form. This study also shows that the ratio of flour to bread, crackers, cake, macaroni, and spaghetti is 1 to 6. More is expended for crackers and cake than for flour. Package cereals are bought as often as cereals for cooking.

The fundamental skills of food preparation concern themselves with the preparation of the most frequently consumed dietary items. These we have found to be: the dairy products, the

[1] United States Federal Trade Commission — *Report on Canned Goods*, 11.

grains, meats, fruits, vegetables, eggs, sugars, and oils. It is hardly necessary to introduce further evidence to indicate the fundamental place which food preparation of the nation's common articles of food has in the daily activities of our people. It is well to repeat here that 94% of all the foods consumed by our nation is furnished by the following commodities: wheat, pork, dairy products, sugars, oils, corn, beef, potatoes, poultry, eggs, vegetables other than potatoes, and apples.

Now, we have seen that there are certain desirable articles of food which are not sufficiently consumed. It is reasonable to assume that the underconsumption of these food items is partly due to the ignorance of methods of preparing them. At any rate, there can be no certainty of increasing the consumption of such foods unless a knowledge of their preparation is assured. A review of the evidence thus far presented shows that the following desirable foods are underconsumed: cheese, vegetables, fruits, legumes, fish, oatmeal, corn, barley, and cocoa.

The tendency to excessive consumption of meat can be utilized and given proper direction in the preparation of foods. The meats are especially savory. The cook can extract the flavor of meat from small quantities and apply it to the preparation of grains, legumes, and nuts, which have a high protein value. The vegetarians have developed the art of flavoring peas, nuts, potatoes, wheat, and other grains with tomatoes, onions, mushrooms, peppers, and spices. It is doubtful whether Italians would consume so little meat if they did not know the art of seasoning. The Chinese dishes which are popular in America have little meat but are highly flavored. It is possible to increase the consumption of the grains, legumes, and nuts by the application of meat and vegetable flavors.

It is possible to increase the consumption of cheese by increasing the knowledge of how to make cheese in the home and how to use it in cooking. The acquisition of skill in preparing vegetables, fruits, fish, oatmeal, corn, barley, and cocoa is a necessary condition for the popularization of these foods.

The cooking of vegetables has been the subject of a good deal

of experimentation and the results should become generally known and incorporated into the simple habits of the people. Boiled vegetables lose from 15% to 60% of their full value due to cooking. Losses in salts and nitrogen often, if not always, slightly exceed the fuel and caloric losses. Salting the water decreases the loss in fuel value due to boiling. Cutting the vegetables crosswise instead of lengthwise and cutting them into small pieces increase the losses. Steaming cuts the caloric and salt losses to zero.[1]

Objectives Concerned with the Preparation of Food

To discover whether one's food habits are based on custom rather than on economy and health.
To help the immigrant adjust himself to an American diet.
To ascertain the extent of saving which results from home cooking.
To use prepared food only when necessary or when more economical.
To prepare and cook the dairy products, cereals, meats, fruits, vegetables, and eggs.
To increase the consumption of cheap foods by especially learning to prepare and cook them in a palatable way. These are: cheese, vegetables, fruits, legumes, fish, oatmeal, corn, barley, and cocoa.
To use the flavor of meat in cooking grains, legumes, and nuts in order to increase their consumption.
To flavor the rich protein foods with tomatoes, onions, mushrooms, peppers, and spices.
To make cheese and to use it in cooking.
To cook flank steak, chuck or round steak, chuck roast, neck of beef, and cross rib to make them serve as well as the expensive cuts.
To avoid waste of juices in cooking and cleaning meat.
To know how to cook the tougher cuts of meat.
To know the effect of heat on the flavor and food value of: milk, bread, cereals, meat, eggs, and potatoes.
To cook dried fruit and vegetables.
To prepare palatable beverages with milk as the foundation.
To know the loss of nutrients due to boiling vegetables.
To cut vegetables to reduce the losses in nutrients.
To know the value of steaming vegetables and to practice it.

[1] Denton, M. C. — "Changes in Food Value of Vegetables Due to Cooking," *Journal of Home Economics*, XL, 143–154, 200–209.

Food for the Sick

The sick require specially selected and specially prepared food. The extent of sickness has been studied very widely in connection with industry. The best figures for general illness are given in the summary of 7 community sickness surveys, including 637,038 persons, compiled by M. L. Stecker,[1] who reports that somewhat more than 2% of the persons canvassed at one time were found ill. Medical service was employed in 70.3% of all cases. In three of the communities for which there are figures, 16% of the total sick received care in hospitals. The remaining 84% were cared for (and consequently had to be fed) in the home.

The Public Health Committee of the New York Academy of Medicine made a canvass [2] of 2023 families of various nationalities, including 8645 persons, and found that 36.4% were ill during the previous year.

The sicknesses which are treated most generally in the home and for which dietary adjustments must be made most frequently are the common minor illnesses, such as colds, sore throat, headache, fever, indigestion, constipation, and dysmenorrhea. The extent of minor sickness is indicated in a study of 1282 office workers including 11,259 cases of illness, ending January 31, 1921, reported by D. K. Brundage.[3] The most frequent ailments affected by the diet which were treated in the dispensary were: colds, 11.5%; headache, 9.0%; sore throat, 9.0%; indigestion, 5.4%; dysmenorrhea, 5.3%; constipation, 5%. These alone comprise 45% of the total cases of illness. An illustration of the manner in which the mass of people treat minor illnesses is furnished by the New York Academy of Medicine, referred to in the preceding paragraph. Colds, stomach trouble, and "being run down" were selected as typical illnesses. Of the sufferers from these ills, 1% went to a hospital, 12% went to a dispensary, 43% consulted a physician, 44% received no medical advice. Of all these patients, 99% were fed in the home. Thus it is seen that there

[1] Stecker, M. L. — *Some Recent Morbidity Data*, 21; 1919.
[2] "The Problem of Disease"; *Modern Medicine*, II, 525, July, 1920.
[3] *Public Health Reports*, XXVII, 529; United States Public Health Office, March 10, 1922.

are a few common ailments which are usually treated in the home and for which special dietary care is necessary. The proper knowledge and habits connected with this care are vital to every home.

In this connection it is only necessary to record the supreme importance of the place of feeding infants and children in the daily life of our people. The feeding of children is a special problem which potentially concerns every man and woman.

Objectives Concerned with Food for the Sick

To consume proper food when suffering from colds, sore throat, headache, indigestion, constipation, and dysmenorrhea.
To feed properly those suffering from the above ailments.
To feed the infant properly.

Waste in the Use of Food

The most conservative figures of the waste of edible foods in this country are those of Raymond Pearl, who had to estimate them cautiously in order to determine the actual consumption of nutritive foods. Due to waste, he reduces the protein intake of our nation by 5%, the fat intake by 25%, and the carbohydrate intake by 20%. L. F. Langworthy calculated an average waste of 10% in 200 dietary studies.[1]

The most reliable index of waste of edible foods is the volume of garbage disposed of. Therefore Raymond Pearl[2] collected statistics of garbage disposal of 96 cities from May, 1916, to May, 1918, covering a population of 26,000,000. The figures in this study show that 10% less garbage was collected in 1917–1918 than in the previous year. The conservation of food during 1917–1918 is more emphatically demonstrated by the statistics of grease recovered from garbage. The 12 cities which furnished data showed a reduction of 30% in the amount of grease recovered. The average per cent of grease in the garbage dropped from 2.45% to 1.85%.

[1] United States Office of Experiment Stations, Circular 110; *Food Customs and Diet in American Homes*, 19.

[2] Pearl, Raymond — "Statistics of Garbage Collection and Garbage Grease Recovery in American Cities," *The Journal of Industrial and Engineering Chemistry*, X, 930, November, 1918.

The reduction of waste in 1917–1918 was due to the educational activities of the Food Administration. When peace was declared and the Food Administration ceased to operate, the amount of garbage increased immediately. The amount of garbage handled in November, 1918, increased from 10% to 25% over the amount handled the previous month.[1]

A survey[2] of garbage disposal made in New York City, July, 1917, showed that 27% of the material found, amounting to $16,000,000 per year, was apparently fit for use when thrown into the garbage pail. Of this waste material, one-third was bread and one-sixth was meat.

An illustration of American food waste comes to light in an interesting way. An American business man came to London to sell a patent designed to recover grease from garbage. He claimed that in New York City 25,000,000 pounds of grease was recovered in a year and yielded very large profits. The Englishman, knowing our wasteful food habits, was skeptical about the profits on London garbage. The scheme was tried but every dollar spent on the enterprise was lost.[3]

Food waste which reaches the garbage pail may result from careless marketing and storing of foods, it may be due to lack of balance in the selection of food elements, it may result from poor cooking, and it may be the result of sheer improvidence. Food is very often regarded apart from its intrinsic function of nourishment. The consumer's attitude toward it gets mixed up with pride and custom — it is not proper to leave a clean plate; it is a sign of stinginess to leave a frugal garbage pail; it is vulgar to use left-over food; it is belittling to save odds and ends of vegetables and meats. These superstitions must be overcome by setting up the simple habits of frugality as desirable ends. The waste of food occurs principally in connection with potatoes, carrots, cabbage, bean-pods, scraps of meat, gravy, fat, fruits, bread, sour milk, and cream.

[1] BALDENSPERGER, H. L. — *Annals American Academy of Political Science*, LXXXVII, 128, January, 1920.
[2] BROWN, L. P. — "Food Wastes"; *Journal of the Franklin Institute*, CLXXXV, 585, May, 1918.
[3] *Proceedings of the Paint and Varnish Society, London;* Session 1918–1919, No. 1, page 7.

Objectives Concerned with Waste in the Use of Food

To consume all the edible food which is purchased.
To save odds and ends of vegetables and meat for soup.
To make palatable dishes of left-over food.
To extract and conserve all the fat in meat.
To use the by-products of potatoes, carrots, cabbage, bean-pods, fruits, and milk.
To avoid waste in paring vegetables.
To purchase enough food and not too much.

Food Measurement and Calculation

The improvement of food habits is in part dependent upon the mastery of certain numerical knowledge and skills. We wish here to discover what numerical operations a person must be able to perform in order to be an effective consumer of foods.

For information concerning the present use of numerical operations in connection with food consumption, we have G. M. Wilson's study [1] of the actual operations made by 4068 persons in 14,583 cases. In this group the country, the small town, and the large city are represented, and 155 occupations are included, the distribution of occupations following roughly the distribution for the population of the nation.

The investigator had the parents of school children in the last three grades of the elementary school record each day for two weeks what actual use of arithmetic they had made. The record was made in problem form. The problems involved buying, wages, interest, rent, insurance, building materials, dry goods, clothing, and food.

Food calculations were 45.9% of the total of 14,583 problems. Those relating to food were distributed as follows:

Table XXI

DISTRIBUTION OF PROBLEMS RELATING TO FOOD

Butter	394	Fruit	334	Meat	663
Eggs	462	Garden truck	63	Milk	736
Flour	117	Groceries	3398	Pastry	36
Food	148	Lunches	6	Potatoes	203

[1] Wilson, G. M. — *A Survey of the Social and Business Usage of Arithmetic*, 29–55.

Again we find the few important food commodities recurring in a different setting. Food calculations are chiefly related to groceries, milk, meat, butter, eggs, fruit, and potatoes.

The four fundamental operations and fractions are used most frequently. Accounts occur in 5.53% and percentage occurs in 4.84% of all operations. The infrequency of calculations involving accounts and percentage indicates two defects in current practice for which our study of food consumption thus far will require a remedy. The present defects are lack of training in keeping accounts and the lack of food management requiring this knowledge. The use of weights and measures occurs in 2.19% of all the household calculations. The reason for the infrequent use of weights and measures is probably the lack of ability to manipulate them.

In order to achieve the improvement in food consumption implied in the foregoing discussion of food habits and standards it will be necessary to acquire a body of arithmetical skills concerned especially with selection, preparation, and marketing of food.

The use of weights and measures in calculations related to the chief food commodities can be ascertained by noting the measuring unit of each commodity. Thus it is seen that the pound is used in 65%, the package in 25%, the dozen in 6%, and the quart in 3% of the food transactions. In connection with the use of these measuring units practically all foods are sold in fractions of pound, quart, and dozen, these fractions being the simplest ones. The use of the fraction is especially important since the great mass of people are still buying in small quantities. It is necessary to be able to check up the cost of a fraction of a unit of a commodity when the cost of a unit is known. While it is unsound economy to buy by the nickel or dime, it is important to be able to check up approximately the unit or fraction of a unit received for the amount. When a large order is purchased the bill involves simple multiplication and addition including fractions and a facility in recording them. When food is purchased and delivered to the home it is necessary to weigh or measure the articles. For this purpose one must know how to select and use a suitable weigh-

ing scale, quart and pint measures, and a glass graduate. When the same commodity is bought in packages of different sizes, economy commands that they be weighed or measured, reduced to common units, and compared. The bread study already reported showed that bread was sold in loaves ranging from one to one-and-a-half pounds. When goods are bought in packages it is good economy to ascertain the contents and to compare the cost of the package with the cost of the same goods in bulk.

To select foods according to their nutritive values it will be necessary to understand tables showing protein, caloric, and ash values of the chief food commodities. Simple calculations will show whether there is any deficiency in any of the food elements. When economy requires a change in diet it will be possible to calculate the amount saved by such a change.

In preparation of food accurate measurement following the figures of recipes requires simple calculations. The table of equivalent weights and measures of the spoon and the cup must be known. It is necessary to perform the simple calculations to increase or decrease the ingredients prescribed in a recipe. Economical use of fuel in cooking requires that one shall be able to read the gas and electric meter and to test the amount of gas used in cooking under different pressure.

The change in the marketing habits of people is dependent upon the development of the attitude of planning, which is closely connected with the development of arithmetical abilities. The budget is the foundation of all economical buying. The calculations involved in making the food budget are the simple operations involving the weights and measures already discussed and their conversion into terms of money. It is necessary to make percentile comparisons of group with group and of month with month and of year with year in order to discover leaks. When the available money increases or decreases or when the budget increases or decreases it is necessary to make percentile calculations to keep within the allowances for articles or groups of articles. It is necessary to calculate the per cent which groups of commodities are of the entire budget.

When the budget has been planned it is then possible to purchase in advance in large quantities. This requires an ability to read the tables of retail and wholesale market prices in newspapers and magazines. Large quantity purchases require calculations to ascertain the amount to be bought, the time such amount will last, the amount saved, etc. Assuming that flour will keep six months, it is necessary to find out how much one's family will require in that time. If a barrel or bag is too much for one family, it is necessary to make the fractional calculation of weight and cost to decide how many families it will require to purchase the barrel or bag.

Objectives Concerned with Food Measurement and Calculation

To add, subtract, multiply, and divide, using the common quantities of milk, meat, butter, eggs, fruit, and potatoes.
To keep accounts of expenditure.
To convert the pound, quart, and dozen into smaller units and to use these measures in simple calculations.
To use the simple fractions in converting the pound, quart, and dozen to smaller units.
To calculate the cost of a fraction of pound, quart, and dozen when the cost of a unit is known.
To ascertain the fraction of a unit received when a purchase is made by money instead of by weight.
To set down in bill form a large purchase order for the purpose of checking it.
To check up a bill.
To weigh and measure purchased articles accurately.
To read a glass graduate.
To obtain a result as a fraction or per cent when a comparison of cost or quantity is made.
To read tables showing nutritive value of food commodities.
To calculate how much can be saved by a change in the diet.
To calculate the amount of nutritive elements consumed and to make comparison with standards.
To read recipes accurately.
To know the table of equivalent weights and measures of the spoon and cup.

To perform the calculations necessary to increase or decrease the ingredients prescribed in a recipe.

To read the gas and electric meter.

To test the amount of gas used at different times.

To perform the simple operations necessary to convert weights and measures into terms of money in making the food budget.

To discover leaks in the budget by making percentile comparisons of group with group and of month with month and of year with year.

To calculate the per cent which groups of commodities are of the entire budget.

To increase or decrease the budget in proportion to the increase or decrease in the income.

To read the tables of retail and wholesale market prices in newspapers and magazines.

To calculate the amount needed in a given time when a large quantity is purchased.

To ascertain the amount saved by a large quantity purchase.

To use the ton, cord, or kilowatt-hour in fuel calculations.

To calculate the dividend of a member of a coöperative store.

Use of Fuel in Cooking[1]

The waste in the use of natural gas is a very serious problem. There are over 2,400,000 domestic natural gas consumers in 23 states and they waste more than 80% of the natural gas received.[2] The supply of natural gas is limited and is not replaced by nature. The waste of gas is due first, to leaks in pipes and fixtures; second, to inefficient cooking appliances; and third, to burning gas unnecessarily. The conservation of natural gas is exceedingly important because it is convenient and economical. The following data [3] reported by S. S. Wyer in a bulletin of Ohio State University Department of Home Economics show that natural gas is the cheapest of five fuel materials.

[1] The general problem of fuel consumption is treated in a separate chapter elsewhere.

[2] Wyer, S. S. — *Waste and Correct Use of Natural Gas in the Home*, 5; United States Bureau of Mines, Technical Paper 257.

[3] Wyer, S. S. — "Relative Cost of Fuels Used for Cooking"; *Gas Age*, July 16, 1917. XL, 69–70.

TABLE XXII

RELATIVE COST OF FUEL MATERIALS IN COOKING A DINNER

Natural gas ($1 per M cu. ft.) . . .	1.1 cents with 1 to 2 oz. pressure
Natural gas ($1 per M cu. ft.) . . .	2.2 cents with 4 to 5 oz. pressure
Soft coal ($6.50 per ton)	2.5 cents
Gasoline (27¢ per gallon)	4.6 cents
Electricity (3¢ per kilowatt hour) . .	5.0 cents
Coal oil (15¢ per gallon)	5.4 cents

Fuel gas is a dangerous article. Most people have been satisfied to apply the lighted match and beyond that to experiment with gas appliances very little. While the chemistry of illumination may be difficult there are simple facts which the average person can easily learn. More heat is produced under low pressure when more air is allowed to enter by adjusting the spud. The tip of the blue flame gives maximum heat. The cooking vessel should be raised or lowered to this point. Much heat is wasted in radiation, especially in the baker of gas ranges. The use of insulating material will reduce waste.

The waste of heat in the use of coal is chiefly due to improper control of the flow of air. Flow of air through the coal makes it burn. The damper, the check damper, the coal door, the ash-pit door, affect the flow of air. The efficiency of the coal range for domestic cooking is estimated by B. L. Steele of the State College of Washington [1] to be 2.5%. Improper use of the coal stove for cooking, therefore, is very extravagant.

The United States Fuel Administration states that there is a vast quantity of dead wood in many sections, sufficient for domestic purposes. According to a bulletin of the United States Fuel Administration [2] by Karl Pfeiffer one cord of hickory, white oak, and locust have the fuel value of one ton of hard coal.

Electricity as a cooking fuel has advantages of convenience rather than economy. The electric cooking stove has a higher efficiency than any other cooking appliance and in sections of the country where water power is abundant it is likely that the cost of electricity can be considerably reduced. Experiments con-

[1] State College of Washington Extension Service; *Bulletin No. 32*, Series 1.
[2] United States Fuel Administration; *Fuel Facts*, August 1, 1918.

ducted at the State College of Washington showed that cost of cooking for a week for a family of five on the coal range was 77.4¢ and on the electric range it was 78.5¢. This is unusual; but when it can be demonstrated that electricity can be obtained at such a relatively low cost, the consumer should be ready to make the discovery and promptly adopt electricity as the cooking fuel.

Objectives Concerned with the Use of Fuel in Cooking

To discover leaks in gas pipes.
To select efficient cooking appliances.
To burn gas only when necessary.
To use low or high pressure when necessary.
To adjust the spud to the pressure used.
To raise or lower the cooking vessel to get maximum heat.
To reduce waste of fuel from unnecessary radiation.
To adjust the damper, check damper, coal door, ash-pit door in order to get maximum efficiency in cooking.
To use wood in making light quick fires.
To mix wood with coal as fuel where wood is cheap and abundant.
To determine whether electric cooking is economical.
To test the relative cost of fuels for cooking.
To produce the kind of flame which gives most heat.

Miscellaneous Skills Connected with Food Consumption

I. Serving Food and Table Manners

There is an intimate relation between the fundamental economic habits and citizenship in a democracy. Certain forms have developed around the process of food consumption, the ignorance of which is often a redoubtable barrier to the free association of individuals and groups. America is a heterogeneous nation composed of many races, colors, religions, nationalities, and other social groups. Of our population, 13% is foreign born, 21.4% is native of foreign or mixed parentage, giving a total of 34% of our population who have distinct table practices. It is hardly necessary to conform to one form of food service and table customs, but it is extremely necessary to establish forms of clean and or-

derly table habits which will remove one basis of discomfort which results from the mingling of rural and urban groups, of foreign and native groups, and of upper and lower economic groups.

II. HOUSEHOLD APPLIANCES CONNECTED WITH FOOD CONSUMPTION

The common household appliances connected with food consumption are dishes, silverware, glassware, pantry, cupboard, various containers, refrigerator, food chopper, freezer, table linen, cooking range, sink, fireless cooker, cleaning and polishing preparations.

The proper use of ice in the refrigerator and the care of the refrigerator are important for economical and sanitary reasons. Silverware is solid or plated. The mass of people use plated silverware. The thickness of the silver coating is expressed in number of coatings or in pennyweight. The former method is unreliable because there is no way of judging the thickness of each coating. When the latter method is used, the number of pennyweights indicates the amount of silver used in coating a dozen articles. For example, spoons marked *20 pennyweights* are a high-grade product.

The commercial market produces utensils that are best adapted for baking, roasting, stewing, sautéing, frying, candy making, and jelly making. The burdens of the kitchen may be simplified if the household is equipped with these special utensils. The home-maker is confronted with the problem of selecting utensils from a group of several varieties: ironware, tin-plated, aluminum, and enameled ware. Each of these has special advantages and disadvantages.

General science and domestic science have discovered improvements which should modify the traditional selection, arrangement, and use of kitchen appliances. The school is the laboratory of domestic art. When an experiment in kitchen practice is made and the result is accepted it becomes the duty of the school to prepare the generation to take advantage of the newly discovered practice.

Commercial houses are daily inundating the public markets with their wares. Commerce is utilizing a powerful educational force in the form of advertising, the accuracy of which there is no adequate assurance. The school must act as a check on the questionable commercial products used in food consumption.

Objectives Concerned with Miscellaneous Skills Connected with Food Consumption

To prepare the table in a convenient and orderly manner for meals.
To serve food in a most economical and orderly manner.
To acquire clean and orderly table practices.
To select dishes, silverware, refrigerator, food chopper, freezer, cooking range, cleaning and polishing preparations, and other utensils which are most economical and serviceable.
To use ice economically.
To make and use a fireless cooker.
To test and adopt newly discovered improvements in kitchen appliances.
To evaluate the appliances of the commercial market.
To decorate the table for meals.
To wash dishes efficiently.
To organize the kitchen so as to save time and labor.
To judge the quality of plated silver from the method of marking it.
To select appropriate utensils for baking, roasting, stewing, sautéing, frying, candy making, and jelly making.
To know the relative value of ironware, tin-plated, aluminum, and enameled ware.

CHAPTER IV

HOUSING

The American Dwelling

Having just completed a consideration of the reconstruction of food habits of the nation, we are impressed by the contrast it makes with the problem of the reconstruction of the housing habits of our people. We have seen that the standards of food consumption can be attained by a wide range of income groups. The nutritive elements of food can be purchased at a very wide range of prices and the units of food purchase are very small. The purchase of a house or of housing equipment, on the other hand, requires a very large initial outlay. This initial outlay cannot fall below a minimum which it is difficult for the mass of people to accumulate. The range of costs of the materials and labor connected with the construction of a house is limited. The habits and attitudes involved in meeting the housing needs of our people do not seem to be as direct and immediate as those concerned with food, yet the needs are no less fundamental and insistent. The improvement of housing conditions appears to be dependent to a large degree upon social conditions and deferred values, both of which increase the difficulty of educational endeavor.

It must be remembered that this study is national in scope. Most people think of a home in terms of their local experience. Many people identify the housing problem with the tenement. Tenements are of course a serious problem and will be considered within the limits of their importance on a national scale. The facts, however, are that 54.2% of all the dwellings in the nation are rural and 45.8% are urban. We shall see that of the urban dwellers only a limited number live in tenement houses. "Judg-

ing from estimates obtained from real estate boards, officers of building and loan associations, engineers and city officials, more than 75% of all dwellings in the United States are frame." [1]

The predominant American dwelling is the single-family house, of four rooms for the industrial worker, and five rooms for the farmer. The number of families per dwelling according to the census report of 1920 is 1.18. That is, taken by and large, the house is the dwelling place of one family. As reported in 1920, 45.6% of the homes in the United States were owned by their occupants.

At the outset of this discussion it is pertinent to set down the bare facts concerning the housing experience of our national government during the war. If we had the mood of that time, we should have little difficulty in discovering the goal to be achieved by educational, political, or economic action. The housing program of the Federal Government arose from the need of obtaining a sufficient number of workers in the many war industries. Both the quantity and quality of housing accommodation were responsible for the shortage of workers. The early housing measures provided by the government were not adequate, and resulted in excessive labor turnover. This condition led to the conclusion that in order to get better results in production it was necessary to increase the investment in war industries to include the proper housing of the workers' families.

The United States Housing Corporation was created with the privilege of spending $100,000,000 for homes. The houses which were completed embodied the best principles of house construction. The houses were detached and semi-detached; they were economical in the use of space, in the method of framing; they were skillfully treated for wall, roof, and windows; they were varied by differences in the location of the porches, in the roof treatment, window-placing, and in the set-back of the houses from the street; they were supplied with excellent plumbing; and they were well designed as a group.[2] This program of construction was abandoned at the end of the war.

[1] Gries, John M. — *Proceedings of the American Society of Civil Engineers*, February, 1922.
[2] Olmstead, F. L. — *Monthly Labor Review*, May, 1919, VIII, 27–38; United States Bureau of Labor Statistics.

Objectives Concerning the American Dwelling

To get an accurate concept of the typical American dwelling.
To keep fresh in the minds of the people the housing achievements of our government during the war.
To instill an interest in housing as a fundamental element of progress.
To guard the American tradition that the house is the dwelling place of one family.

The Housing Conditions of the Nation as Revealed by Surveys

That there is a housing problem which concerns the whole nation, nobody can deny; housing needs have been revealed by numerous surveys of housing conditions in all parts of the United States. For this discussion the data of all the more significant surveys which are reported have been collected and tabulated. The more comprehensive studies are national in scope and give data which are widely applicable. The comprehensive studies reported are the survey of the principal industrial cities in the United States, made by the British Board of Trade, reported in *Senate Document 38*, 1911; a survey of housing conditions in 94 cities, made by the United States Bureau of Labor Statistics, reported in the *Monthly Labor Review*, September, 1920; and a survey of 10,000 representative homes in the rural regions of 33 northern and western states, made by the Department of Agriculture, reported in *Circular 148* of that department. The local studies which were used were surveys made in several cities in various parts of the United States. The comprehensive and local studies, chiefly, will form the basis of our conclusions.

In addition there is a quantity of scattered information, including census figures, which in some cases are more inclusive than the survey figures and in others are merely additional to them. Concerning every aspect of the housing of the people it is the aim of this study to get an accurate estimate of the economic importance of housing and the extent to which it affects our population. The data on the surveys follow.

TABLE XXIII

SUMMARY OF HOUSING SURVEYS[1]

LOCATION	DATE	AUTHOR	NUMBER OF FAMILIES INCLUDED	AMOUNT PAID FOR HOUSING	PER CENT OF TOTAL EXPENSE PAID FOR HOUSING	PREDOMINANT TYPE OF HOUSE	NUMBER OF ROOMS PER FAMILY	PERSONS PER ROOM	WATER SUPPLY IN KITCHEN, PER CENT	BATH TUBS, PER CENT	TOILET IN HOUSE OR APARTMENT, PER CENT	FAMILIES HAVING DARK ROOMS, PER CENT	AMOUNT LIVING IN TENEMENTS, PER CENT	AMOUNT OWN HOMES, PER CENT
1. Columbus, Ohio	1921	R. D. McKenzie	1,000	166.80			5.00	1.30		40.70	43.5		30.0	
2. Baltimore, Md.	1921	Real Estate Board	131,711				7.20	.73						62.2
3. Attleboro, Mass.	1921	Chamber of Commerce	2,102	222.04		50% 1-family	5.30						50.5	
4. Cincinnati, Ohio	1919	Better Housing League	5,993[2]	188.16	18.30		4.90	1.20	76.0	4.70	30.0	10.0	40.0	13.8
5. 33 States	1919	F. E. Ward	10,000			cottage	7.80		60.0	20.00	15.0			
6. 94 Cities	1919	U. S. Bur. Labor Statistics	3,379	163.75		apartment	4.00			62.60	88.0			
7. 94 Cities	1919	U. S. Bur. Labor Statistics	5,740	175.00	13.40	1-family	4.95			47.70	57.8			
8. Brooklyn, N. Y.	1918	John Gebhart	3,227	134.88		tenement	3.80	1.40	96.60	22.40	43.4	52.9	80.6	
9. Cleveland, Ohio	1918	Chamber of Commerce	14,688	181.08	18.30	50% 1-family	4.90	1.20			63.7		27.1	13.8
10. Philadelphia, Pa.	1918	Bur. of Mun. Research	260	177.75	14.10	1-family	6.00		93.10	86.20	66.9			16.2
11. St. Paul, Minn.	1917	C. Aronovici	4,482					.93		55.98	58.8			28.0
12. Los Angeles, Cal.	1916	Gladys Patric	331	108.72	18.70				86.70	41.60	31.4			5.7
13. Providence, R. I.	1916	John Ihlder	644[3]								86.9	43.6	5.7	
14. Richmond, Va.	1913	G. A. Weber	600	67.20	11.20		3.50		22.00		11.2			10.0
15. New Britain, Conn.	1912	C. Aronovici	822	124.80		50% tenement	3.97			21.70	23.8	16.8	56.5	
16. 27 Northern American cities	1909	British Board of Trade	90,000	133.12	16.66		4.00	1.00						15.5
17. New York, N. Y.	1905	L. B. More	200	162.26	19.40	tenement	3.60	1.60				54.7		

[1] The sources of these surveys are given in the Bibliography. [2] Apartments. [3] Houses.

Housing Standards

In order to evaluate the conditions ascertained from a study of the surveys, we present here five housing standards. Two of these were worked out by experts; two by government agencies; and one by a committee of a national building association. The single family house is mentioned specifically in two of these standards and the two-story row house in a third. The standard which embodies the best intelligence on housing and which received widest attention was that worked out by a committee appointed by the Department of Labor. It was intended for use as a basis for government construction of houses for workers engaged in war industries. This standard requires that group houses shall not be more than two rooms deep; that basements shall not be used as living quarters; that every bedroom shall be supplied with a clothes closet; that no board fences shall be erected; that suitable arrangements for drying clothes shall be provided; that water-closets with individual flush tanks shall be installed in the house; that hot and cold water shall be supplied to all fixtures; that every room shall have at least one window opening to the outer air; that the cellar shall be well lighted, paved, and dry; that a sink and washtubs shall be placed in the kitchen; that the minimum height of a room shall be eight feet; that each house shall consist of a parlor, kitchen, three bedrooms, and a bathroom.[1] The table of standards is given on page 82.

By comparing the housing habits of the people of our nation as gathered from surveys with the best standards of housing we conclude which of these habits should be encouraged, which should be eliminated, and what new habits need to be developed. As we proceed with our problem we shall refer to significant data not contained in the surveys but throwing light on our problem. It will be necessary to discuss at length the special problems which arise from a comparison of actual living conditions with standard conditions. These special problems are: home ownership, congestion, rent, tenements, ventilation, heating, and lighting.

[1] *Architectural Record*, April, 1918, XLIII, 344–359.

TABLE XXIV

SUMMARY OF HOUSING STANDARDS

AUTHOR	RENT	TYPE OF HOUSE	NO. OF ROOMS	TOILET IN HOUSE	BATHTUB	GAS FOR HEATING	ONE WINDOW PER ROOM	CLOSET SPACE	STORAGE SPACE	RUNNING WATER	LIGHTING	DRAINAGE	LAUNDRY	WASHTUBS
Phila. Bureau of Municipal Research	$360	2-story row	6	√	√	√							√	
Bureau of Applied Economics			5	√	√		√	√	√					
U. S. Labor Department to govern war housing projects			5	√	√	√	√	√		√	√			√
Mass. Homestead Commission		1-family	5	√	√	√	√	√	√	√	√	√		
Committee on Farm Housing, National Conference on Concrete House Construction		1-family	5	√	√			√	√	√	√	√	√	

The sources of these standards are given in the Bibliography.

Objectives Concerning the Knowledge of Housing Conditions and Standards

To know the fundamental elements which determine the quality of a home.

To understand the significance of rent, number of rooms, water supply, bathtubs, ventilation, and home ownership as elements of the housing problem.

To make a housing standard a part of the mental habits of the people of our nation — and that this standard shall include the following elements: rent, type of house, number of rooms, toilet, bath, gas for heating, ventilation, closet space, storage space, running water, lighting, drainage, laundry, and washtubs.

To use these standards in the purchase and selection of a house.

To know how to report illegal housing conditions to the proper government authority.

Home Ownership

Data concerning home ownership in the country are furnished by the Census Bureau.[1] Of the homes in the United States, 54.4% were rented and 45.6% were owned by their occupants. Of the 45.6% homes owned, 28.2% were free from encumbrance and 17.5% were mortgaged. In the last ten years the proportion of rented homes rose from 54.2% to 54.4%. The increase of apartment dwellings in cities affected home ownership only to a slight degree. In fact, 45 of the 68 cities having 100,000 inhabitants or more in 1920 showed an increase in the percentage of owned homes. This increase applies to New York, Chicago, Boston, and Pittsburgh, where the percentage of rented homes is very high, due to the predominance of the tenement home.

Bulletin No. 295 of the Bureau of Labor Statistics, January, 1922, presents an analysis of building operations in 218 cities of the United States for 1920. The cost per dwelling in 1920 is given in the table on page 84.

[1] United States Bureau of the Census; *Fourteenth Census of the U. S.*, V. 2, 1279, 1923.

TABLE XXV

AVERAGE COST PER FAMILY OF DWELLINGS IN 196 CITIES IN 1920

KIND OF DWELLING	COST PER FAMILY
One- or two-family house with stores	$5625
One-family house	4320
Multi-family house	4169
Two-family house	3720
Average per family	4036

Using 9% of the cost of the dwelling as the monthly payment, which is the figure used by the state of Massachusetts, it would require a yearly payment of $360 to own the average one-family house built in 1920. This amount is 25% of the income of the family. To buy the average house built in 1920 in 196 cities on a part-payment plan would require an income of $1440. Making the proper allowances for changes in price levels and referring this figure to King's[1] table of distribution of income among families, we find that 37.38% of the families of the United States had an income sufficient to buy, on a part-payment plan, the average city one-family house built in 1920. This estimate is presented to show that the ownership of a home is not entirely the result of the lack of acceptance of home ownership as a desirable end. The educator here must design a program which attacks the whole problem of wages, income, and production in a particular community.

Massachusetts[2] undertook to build homes in Lowell for employees earning $15 per week and less. The monthly payment toward ownership was fixed at 25% of the monthly income. The state built a single, five-room house, 18 × 22 ft., for $2313. The house met the requirements of the best standards. The monthly payment is computed as about 9% of the selling value of the home.

Taking the Massachusetts figures, which are very low, as a

[1] KING, W. I. — *Wealth and Income in the United States*, 224.
[2] Massachusetts Homestead Commission; *Annual Report*, 7 f.; 1916.

basis of cost of building construction for families of low income, we can apply them, theoretically to the whole population of the nation. We wish to estimate what per cent of the families of the nation earn enough money to buy a house on the most reasonable terms. Since the homes in Lowell were built in 1918 it is first necessary to convert the cost of the given home into current prices, according to the table of index numbers of cost of building construction printed in *Engineering News*, May, 1921. The cost of the five-room house in 1921 would be $2650.31. On this house there would be a yearly payment of $238.53, which is 25% of the family income of $954.12. Reducing this income to the price level of 1910, and applying it to King's table of distribution of incomes among families, we estimate that 75.8% of the families of the United States have an income sufficient to buy the house built by the state of Massachusetts in Lowell, on a part-payment plan. Applying a similar course of reasoning to the population of Massachusetts, Mr. Nolen [1] concluded that in 1917 half of all the workingmen could not afford to own or rent the one-family house described above. Again it is clear that were every person in the state of Massachusetts converted to the plan of purchasing a home there still would be from 25% to 50% of the families who would be incapable of putting this plan into practice. For the whole population, therefore, home ownership is a problem of wage standards and production as well as one of the development of the right attitude.

A housing survey in Attleboro, Mass., 1921, reports that 535, or 25.4% of the families expressed a desire to own their homes. Of these, 57% were able to make some initial payment and 31% were able to make the required initial payment. It was found that $1500 was the lowest family income sufficient for buying and maintaining a home. The educational problem concerning home ownership is illustrated here: there are those who need to be made to understand the advantage of home ownership; and there are communities which need to learn how wages and production may be increased.

[1] NOLEN, JOHN — *American Civic Association*, Series II, No. 9, April, 1917.

The relation of income to home ownership may be ascertained from a table given in the study of 3215 family budgets in 27 American cities made by the British Board of Trade. The table gives the percentage of families owning the houses they occupy according to income groups. The number of families owning homes increases as the income increases, which demonstrates that an educational program which can increase the family income will by the same token increase home ownership.

TABLE XXVI

PERCENTAGE OF FAMILIES OWNING HOUSES THEY OCCUPY

FAMILY INCOME PER WEEK	PER CENT OWNING HOMES
Under $9.73	1.49
9.73 to 14.60	2.82
14.60 to 19.47	6.85
19.47 to 24.33	20.36
24.33 to 29.20	24.03
29.20 to 34.07	30.36
34.07 to 38.93	35.11
Over 38.93	32.92
ALL INCOMES	15.46

I. HOME OWNERSHIP AND LIVING CONDITIONS

What is the effect of home ownership on living conditions? The facts revealed by the surveys on this point show that occupants who owned their homes kept them in better condition than those occupants who rented their homes.

The St. Paul survey gives the following data concerning the condition of repair in homes of tenants and owners:

CONDITION	TENANTS	OWNERS
Good	53.85	69.37
Fair	29.37	21.72
Bad	16.78	8.91

The Cincinnati survey shows that 34% of the tenement houses owned by out-of-town owners were in bad repair; 21% of those

owned by non-occupant owners living in the city showed neglect; 8% of the houses belonging to occupants showed neglect.

All the figures which are available show that the number of persons per room is less for owned than for rented homes. The Attleboro survey showed that the average rented home consisted of 5.3 rooms, while the average owned home consisted of 6.6 rooms. Baltimore, which has the largest percentage of owned homes recorded in the surveys reported in this study, has the lowest number of persons per room. There, 62.2% of the homes were owned by the occupants; the average family occupied 7.2 rooms. The average number of persons per room in rented homes was .80; in owned homes the average number of persons per room was .68.

It is evident that cities having a large number of apartment houses will have a small percentage of home ownership and a higher rate of congestion. It is possible to compare the extent of home ownership with the excess of families over homes, by figures given in the 1920 census report. These figures will not show congestion within the home, except in so far as multi-family homes are smaller in general than single-family homes, but it will show congestion of houses. Thus New York, Newark, Jersey City, Boston, Fall River, and Hartford, which show the largest excess of families over dwellings, also show the largest percentage of rented homes. The table for these cities follows:

TABLE XXVII

RELATION OF HOUSE CONGESTION TO RENTED HOMES

City	Per Cent Excess of Families over Dwellings	Rank	Per Cent Homes Rented	Rank
New York	71.4	1	87.3	1
Newark	55.5	2	79.8	5
Jersey City	53.7	3	80.3	3
Boston	51.7	4	81.5	2
Fall River	47.7	5	80.3	4
Hartford	46.5	6	79.2	6

II. HOME OWNERSHIP AND BUILDING TENDENCIES

It is common knowledge that the return on investment in real estate is comparatively low. In response to a questionnaire sent in 1919 to the realtors of the National Association of Real Estate Boards, requesting dependable financial records for a five-year period, it was found that the net earnings on investment in residences ranged from .2% to 1.5% of the investment, while the net earnings on investment in apartments ranged from 1.3 to 2.4% of the investment.[1]

From the point of view of housing standards these data are especially discouraging since they show that, for the landlord, renting the individual dwelling is a less profitable investment than renting the apartment dwelling. While there have been no evidences of radical change in apartment dwelling, the law of profit dictates that to maintain the single-family dwelling standard for the country it will be necessary to increase home ownership in America. Building inspectors in cities under 75,000 population reported that apartment houses were being constructed for the first time in 1920, for the reason that apartments for rent brought in a better return for the money invested than single-family or two-family houses.[2]

III. HOME OWNERSHIP AND LABOR MOBILITY

There are those whose experience with company-owned houses in small industrial centers has led them to oppose home ownership. Housing enterprises of this sort have very little importance, nationally, but it is desirable that housing programs should avoid their dangers. Home ownership should not interfere with labor mobility — the laborer's ability to move from a locality when the demand for labor ceases. The extent of the mobility of workingmen in a large city is illustrated by the study [3] made of a working-

[1] Report of United States Housing Corporation, I, 46–47; 1920.
[2] United States Bureau of Labor Statistics; *Bulletin 295*, 5.
[3] McKenzie, R. O. — "Neighborhood: A Study of Local Life in the City of Columbus, Ohio"; *American Journal of Sociology*, January, 1922.

men's neighborhood in Columbus, Ohio. According to this study, 80.3% of the population lived in the city more than five years; 68.3% lived in the city more than ten years; 46.2% lived in the city more than twenty years. It is significant that the American Federation of Labor has formally declared itself in favor of home ownership rather than tenantry.[1]

IV. SIGNIFICANT AGENCIES FOR EXTENDING HOME OWNERSHIP

The common practice of purchasing homes by making a large initial payment and the further payment of interest on a mortgage is limited to a small group with relatively large incomes. For the great mass of people this is impossible; therefore there have developed such agencies as the Building and Loan Associations, Coöperative Housing Companies, Industrial Housing Corporations, Financing Corporations, and Government Aid.

The most significant force in aiding the average American to own his home is the Building and Loan Association. According to the report of the annual meeting of the United States League of Local Building and Loan Associations held in 1921, there were 8633 Building and Loan Associations in the United States with a total membership of 4,962,919. This means, in effect, that about 20% of the families of the United States are in the process of being aided to own their homes by Building and Loan Associations. In twelve states these associations are organized by state authority under Building and Loan Laws. According to the general plan of Building and Loan Associations about 75% of the value of the property mortgaged may be loaned, to be repaid monthly, in installments of interest and principal, in amounts slightly more than would be paid as rent for similar property. A repayment plan which does not exceed 12 years is most common. The amount paid is approximately $1 per month on $100 borrowed.

[1] United States Senate Report No. 829, 66th Congress, 3d Session.

V. HOME OWNERSHIP AND GOVERNMENT AID

In the whole of the United States there is but a single example of government housing — a project undertaken by the Massachusetts Homestead Commission in Lowell as an experiment in providing dwellings for workingmen. It would be easy for the educator to dismiss this matter on the ground that government aid is not an American method of handling the housing situation. We have seen, however, that the cost of building construction under the most favorable conditions cannot descend to the level which the low-income groups can pay. Government aid, is, therefore, a problem which the citizen must consider.

At this time there is a bill before Congress, the Federal Building Loan Act, designed to encourage home ownership and to relieve the housing shortage. This bill would make available nearly two billion dollars in mortgages held by the Building and Loan Associations for the purpose of constructing homes. The plan is to create a system of Federal Building Loan Banks supervised by the Treasury Department similar to the Federal Farm Loan Banks.

The educator will soon realize that the huge government housing programs of other countries will produce results which America will be forced to evaluate. England has undertaken to build 500,000 (recently reduced to 200,000) houses to catch up with building arrears during the war, and 100,000 houses annually as long as there is a need for houses. France is now considering whether it shall embark upon a project of building 500,000 dwellings during the next 10 years. The Canadian government has provided for a loan of $25,000,000 at 5% to the Provincial governments for building purposes. Government aid is operative in some form in Germany, Austria, Hungary, France, Italy, Chile, Argentina, Cuba, Australia, New Zealand, Sweden, Switzerland, and Belgium.[1]

[1] The sources of this section are:
Proceedings of National Conference on Concrete House Construction Held in Chicago, February, 1920.
National Housing Association; *Proceedings of National Conference*, December, 1920.
Wood, Edith E. — *Housing of the Unskilled Wage Earner.*
Housing Betterment, January, 1922, and April, 1922.
Garden Cities and Town Planning, September, 1921.

VI. INDUSTRIAL HOUSING

The United States Bureau of Labor Statistics collected data concerning the nature of housing enterprises conducted by employers in 1916.[1] It is estimated that there were 1000 companies in 1916 engaged in housing their employees. The study covered 213 companies, comprising 423 plants, which employed 466,991 men. Of these men, 34%, or 160,645, lived in company houses. Just 16% of the employers report that they sell their houses to employees. In fact, therefore, the company houses have little effect on home ownership. In principle, however, an important issue is involved.

Of all company homes, 90% were frame structures, and 48% were single-family dwellings. The model company house consisted of four rooms. The repair of company houses is assigned to the company repair department and consequently is secondary in importance.

Only 15% of the companies studied made a definite attempt to plan the company town. Two-thirds of the projects reported were located on undeveloped land requiring a town plan. No sanitary sewers were reported by 40% of the projects; no gas by 70%; no street paving by 45%. In 50% of the communities that reported street cleaning and lighting, fire protection, garbage collection, and sanitary regulations are functions of the company and not of the community.

Clearly, the scheme of industrial housing as it has worked itself out thus far is a modified feudal system. The complete control of housing in a community by employers certainly conflicts with American political doctrine. It is dangerous to be dogmatic about the effect of company housing but it is just this type of problem which demands investigation by the school in order that the inhabitant of an industrially controlled town may be properly guided in making his housing arrangements with an employer. It is important that the fundamental political concepts of our government shall be readily applied to such critical problems.

[1] U. S. Bureau of Labor Statistics, Bulletin No. 263, October, 1920; *Housing by Employers in the United States.*

VII. HOUSING AND FINANCING COMPANIES

Distinct from industrial housing companies, groups of business men and civic bodies have organized housing companies to stimulate house building. The plan of the bulk of these companies is to build or finance the construction of homes to sell to workingmen. The occupant pays down about 10% of the cost of the house and pays off the balance in monthly installments approximately to the amount of rent on the house, in 10 to 15 years. The Civic Development Department of the United States Chamber of Commerce, 1921, reports an investigation of such companies. Fifty-seven housing and financing companies have plans for the building of about 7000 houses, 5714 of which have been completed or are in the process of construction. The principal life insurance companies have engaged in lending money for building construction. The Metropolitan Life Insurance Company, which has about 20,000,000 policyholders and therefore has a considerable interest in their housing, decided to restrict itself to loans on new small dwellings and moderate priced apartment houses with easy payments. The Company has made loans on 5000 dwellings and 600 apartment houses. The Equitable Life Insurance Company has made loans on 5500 houses.[1]

VIII. COÖPERATIVE HOUSING

Coöperative ownership of dwellings in America has developed to a very small degree. The few projects which have been undertaken are apartment buildings. The coöperative plan in the United States is peculiar to multi-family houses, which probably do not exceed, all told, 20% of the dwellings of the nation. We have, however, developed in this country what is in effect a co-operative bank for financing the construction of small homes for families of moderate and low incomes — the Building and Loan Association, which has been discussed. This form of coöperative endeavor applies to the typical American home, the single-family

[1] STABLER, WALTER — *Proceedings National Conference*, 19, December, 1920; National Housing Association.

dwelling. Community development on a coöperative basis is limited to a few examples in the United States. It is possible, however, to conceive of unusual advantages from group undertakings in planning towns and settlements. The development of an attitude which favors the coöperative housing enterprises is so full of economic and social advantages that the educator may well consider it a desirable objective of the curriculum.

Unusual activity in the purchase and construction of coöperative apartment houses of the high rental type has developed in New York City. The occupant makes a cash initial payment and shares in the profit above the operating cost. A similar plan has been worked out for a community of 1000 families occupying about 50 apartment buildings in the Borough of Queens, New York City. The initial payment ranges from $2000 to $500, with a range of monthly payments from $26 to $61.90.[1] Each tenant-owner is a director in the corporation which owns the house.

The best example of a truly coöperative housing project is that of a group of Finns in Brooklyn, who financed, constructed, and now operate two buildings without the help of private capital. The monthly payment for a five-room apartment with modern conveniences is $26. A similar project was organized by a group of professional women whose salary did not exceed $2500 a year. The initial payment was $200, which could be paid in installments, and the monthly payment was $55 on the average.[2]

The Monthly Labor Review, January, 1922, reports the organization of several building guilds after the plan of the English building guilds, which are executing a portion of the government housing program. The stock in these guilds is owned by the labor organizations in the building industry or by their members. In order to assist in meeting the housing needs these organizations have confined themselves to the construction of dwellings. In St. Paul the building guild is capitalized at $100,000, has done business amounting to $200,000 in seven months, and has paid a dividend of 7%. In Boston there is an organization capitalized

[1] MacDougall, E. G. — *Proceedings National Conference*, 46, December, 1920. National Housing Association.
[2] Coöperative League of America; *Report of Proceedings*, 1920, 103–110.

at $100,000, with shares at $10 each, which are sold to union men in the building trades.[1] There are building guilds in Jackson, Michigan, and in Reading, Pennsylvania.

Objectives Concerning Home Ownership

To know the cost of the chief types of dwellings.
To create an interest in ascertaining the relative advantages of owned and rented homes.
To understand and apply the very significant relation between income and home ownership.
To know the minimum income necessary for the purchase of a home on a part-payment plan.
To consider and to do something about making conditions of wages and production conducive to home ownership.
To demonstrate that home ownership improves living conditions, including condition of repair and congestion.
To know that the single-family dwelling is in a measure dependent upon home ownership.
To ascertain accurately how permanent one's position is before purchasing a home.
To ascertain the possibility of disposing of a home when one's position is uncertain.
To become acquainted with the opportunities offered by the Building and Loan Associations with a view to becoming a member.
To consider the possibility of government aid in purchasing homes for the low-income families.
To become familiar with the provisions of the Federal Building Loan Act.
To evaluate the results of government aid in England, France, Canada, and other countries in Europe and Australia.
To know the housing conditions of industrially owned homes and communities.
To determine whether industrially controlled communities conform to American political policy.
To become familiar with Housing and Financing Companies as an aid to purchasing a home.
To learn what opportunities the life insurance companies offer for lending money for construction of homes.

[1] *Engineering and Contracting*, 85, January 26, 1921.

To ascertain the advantages and disadvantages of coöperative housing.
To learn the technique of being a coöperative tenant or owner.
To consider the building guild as an aid to promoting home ownership.
To know the details of law and taxation connected with home ownership.

Tenements and Education

The amount of attention which the curriculum shall give to the tenements depends upon the extent to which such homes exist in the country at present and upon the tendency of tenement construction. We shall see that the frequency of tenements is much less than the urban-minded writers would have us believe and that increase in tenement construction is very gradual. Our curriculum with respect to housing, except in large cities, must still be based upon the single-family dwelling and its problems. The standards must be associated with the detached frame house. In large cities the tendency of the curriculum should also be in the direction of the single-family home, although due attention must be given to the peculiar housing skills presented by tenement conditions.

According to the census report of 1920 the excess of families over dwellings in the United States was equal to 15% of the total number of families. While this does not indicate that only 15% of the nation's families live in plural-family dwellings and while the exact number cannot be calculated from the data collected, the facts tend to show that "somewhat more than the excess of families over dwellings" (that is, somewhat more than 15% of the population) live in plural-family houses.

Judging from current practice in building construction, it would appear that the number of tenements in the United States is even less than the estimate of the Census Bureau. The United States Bureau of Labor Statistics investigated the building operations in 218 cities having a population over 35,000 in 1920.[1] The kind of residential building construction in these cities in 1920 is summarized in the table on page 96.

[1] United States Bureau of Labor Statistics, *Bulletin 295*, page 5.

TABLE XXVIII

KIND OF DWELLINGS CONSTRUCTED IN 1920 IN 196 CITIES

	BUILDINGS	FAMILIES	PER CENT OF TOTAL FAMILIES
One-family houses	68,637	68,637	66.7
Two-family houses	5,402	10,804	10.5
One- or two-family houses with store	846	1,574	1.5
Multi-family houses	1,496	20,946	20.4
Multi-family houses with stores	239	894	.9
TOTAL	76,620	102,855	100.0

The population of all the cities investigated was 32.7% of the population of the United States, and practically all of the tenements in the country will be found in the 218 cities reported here. If the amount of tenement construction in 1920 is in the same ratio as tenements are to all houses, we conclude that about 7% of the population live in tenements.

That there is a slight tendency toward living in plural-family dwellings is indicated by the rise in the excess of families over dwellings in the last three census reports. The excess of families over dwellings was 10.9%, 12.1%, and 15.0% in 1900, 1910, and 1920. The increase is too slight to show any decided tendency of the American people to abandon the single-family dwelling.

This slight tendency is specially marked in urban centers. Of 68 cities having a population of 100,000 or more in 1920, 56 showed an increase in the excess of families over dwellings, which means an increase in the number of plural-family dwellings as compared with the figures of 1910.

In the large metropolitan cities the curriculum maker will have special housing problems to account for. The total number of apartments in New York City corresponds roughly to the number of families living in them. A comparison of this number, 976,397, with the total number of families in New York City, 1,278,341, shows that approximately 75% of the families in New York City live in tenements. In Cincinnati, 40% of the population live in

tenements. In Akron, 22% of the homes are tenements. The Cleveland survey showed 27.1% of the population living in tenements. The metropolitan cities of the nation occupy .062% of the total area and are inhabited by 18.59% of the population. These are the cities of the tenement dwellers.

In New York City in 1917 there were 77,604 old-law tenements with 597,955 apartments, and 27,149 new-law tenements with 378,442 apartments. The old-law tenements are below the housing standards set by law. Throughout the country it will be a long time before houses built before building laws were enacted will disappear. In the meantime the habits and skills developed by the curriculum must presuppose a subnormal housing condition. The details of this condition will be considered separately and will be concerned with lighting, ventilation, fire escapes, play space, congestion, bathing, laundering, decoration, storage, and care.

Objectives Concerning Housing in Tenement Communities

To become familiar with the housing standards set by law.
To install proper lighting apparatus to offset the effect of dark rooms.
To be specially trained in matters of ventilation.
To provide and care for play space for children.
To obtain facilities for bathing when not provided in the home.
To understand thoroughly the effect of congestion on health, comfort, and morals.
To know the more important provisions of the housing code.
To discourage remodeling tenement houses built before the new housing law came into effect.
To keep one's apartment in good repair and to demand that the house be kept in good repair.
To know how to keep a courtyard in good condition.
To keep fire escapes free from encumbrance.
To use a makeshift for the bath.
To take special pains to increase privacy.
To cultivate the habit of keeping flower boxes and other decorations.
To maintain cleanliness in the halls of the house.
To ventilate toilets properly.

Overcrowding

Directly related to the tenement problem but not by any means limited by it is the extent of overcrowding in homes. The standard upon which overcrowding is based is one room per person. This standard does not provide one sleeping room for each person nor even one sleeping room each for the parents, the boys, and the girls. It is however the only test of overcrowding to which available data can be applied.

W. F. Ogburn's [1] study of overcrowding incidental to the study of rents in 92 cities showed that a large proportion of the families were overcrowded. The table follows:

Table XXIX

PER CENT OF FAMILIES OVERCROWDED

City	Overcrowded
Atlanta, Ga.	77.4
Boston, Mass.	52.0
Brazil, Ind.	34.5
Danville, Ill.	34.5
Pana, Ill.	34.5
Bridgeport, Conn.	29.6
Chicago, Ill.	46.3
Denver, Col.	29.6
Huntsville, Ala.	67.2
Meridian, Miss.	67.2
Kansas City	44.0
Memphis, Tenn.	68.7
New Orleans, La. (white)	75.7
New York, N. Y.	42.1
Providence, R. I.	46.7
St. Louis, Mo.	80.1
St. Paul, Minn.	40.7
Minneapolis, Minn.	40.7
San Francisco, Cal.	46.5
Oakland, Cal.	46.5
Seattle, Wash.	44.9
Westfield, Mass.	35.1
Johnstown, N. Y.	35.1
Rutland, Vt.	35.1

[1] United States Bureau of Labor Statistics; *Monthly Labor Review*, September, 1919; page 30.

Of the housing surveys reported in the beginning of this chapter 9 studies give the extent of overcrowding. Of these, 6 surveys show that the average family is overcrowded. It is difficult to estimate the percentage of families which were overcrowded in these studies but since the average number of rooms per person is lower than that of the Ogburn study, it is reasonable to assume that the extent of overcrowding as shown by the surveys reported is greater than that shown in the preceding table.

Without furnishing data Health Commissioner Copeland of New York City reports the extent of overcrowding as ascertained in the housing surveys made by health authorities in cities housing a population of 200,000 or more. "From 20 to 30% of the population of the cities studied is thus affected." [1]

During the fall of 1920 the Department of Health of the City of New York investigated 69,989 houses, including 412,888 families, and found that 26.4% of the houses were overcrowded.[2] In the same year, Detroit made a study of 10,600 persons, 1% of the population, to ascertain the extent of overcrowding, and found that 21% of the families have less than one room for each person.[3]

W. F. Ogburn's study of rents in 91 cities showed that overcrowding is reduced as the expenditure for rent rises. He divided all the families studied into groups having an income of $1400, $1200, $1000, and $800. When the annual expenditure is $1400 only one city has an average of less than one room per person; when the annual expenditure is $1200, two cities fall below this standard; when the annual expenditure is $1000, six cities fall below the standard; when the annual expenditure is $800, nine cities fall below the standard. Thus it is seen that overcrowding is related to income, and that the relation is a broad economic problem as well as one involving personal habits of housing and expenditure. Undoubtedly, there are among the families which are overcrowded, those which by wise selection

[1] United States Senate Report No. 829, 66th Congress, 3d Session, page 12.
[2] *Monthly Bulletin of the Department of Health, City of New York*, February, 1921.
[3] National Housing Association; *Proceedings National Conference*, 185, December, 1920 (article by H. F. Vaughan).

of homes and by proper apportionment of expenditures can eliminate overcrowding.

That such a readjustment is possible is shown by Ogburn's figures, giving the differences in the rent on various kinds of dwellings:

TABLE XXX

DIFFERENCE IN RENT ON VARIOUS DWELLINGS

EXCESS IN RENT OF:	MONTHLY AVERAGE
Apartments over houses	$2.79
Apartments with bath over those without bath	5.13
Houses with bath over those without bath	4.13
Five-room over four-room apartments	.79
Six-room over five-room apartments	1.15
Five-room over four-room houses	2.56
Six-room over five-room houses	1.83

The foregoing table suggests that overcrowding is not entirely due to the amount paid for rent. If the monthly rent of a five-room apartment in the cities studied is on the average only 79¢ greater than a four-room apartment, then undoubtedly the average family would desire to select the five-room apartment. Similarly the sum of $1.15 does not seem sufficient to prevent a family from choosing a six-room apartment instead of a five-room apartment. We conclude, therefore, that the problem of overcrowding, as far as it concerns the individual, consists in judicious selection of a home and the apportionment of the income so as to buy or rent a home large enough for the family. Socially, overcrowding can be relieved by a more equitable distribution of incomes and by liberal policy in house planning.

Objectives on Overcrowding in Homes

To incorporate into the thinking of the people that to have less rooms than at the rate of one person per room is overcrowding.

To rent one sleeping room per person.

STATE COLLEGE FOR WOMEN
TALLAHASSEE, FLORIDA

To know the extent of overcrowding at present.
To increase that portion of the budget spent for rent to such a point as will meet the standard of one room per person.
To select carefully and patiently an apartment which will not result in overcrowding.
To use one's influence, by collective opinion, to improve the standard of house planning.
To secure privacy by proper adjustment and use of screens and the like.

Rent and Education

The Bureau of the Census [1] reports that 54.4% of the families of the nation pay rent. How much do they know about the rates, the factors that determine the rates, the value of the land upon which they live? The care and selection urged heretofore in matters pertaining to food consumption should be likewise exercised in matters pertaining to rent. Rent is the money problem applied to shelter as price is the money problem applied to food. The empty cry of profiteering, no matter how justified, is a very feeble weapon. The consumer's knowledge of facts concerning cost of materials, cost of labor, interest rates, taxes, all of which are available in public documents, are the only effective and honest means of keeping rent at a fair level. Labor unions have been able to obtain fair wages because their leaders have developed the technique of using documentary evidence to define costs of living, distribution of income in an industry, and employers' profits.

I. RENT AND INCOME

Our first problem is to ascertain how much rent the families of this nation are paying for their homes and to compare this figure with several approved standards. W. F. Ogburn made an analysis of house rents from data furnished by 100 families in each of 92 cities during the fall and winter of 1918–1919. The average rent was $174 per year, or approximately $15 a month. Using the table of changes in cost of housing printed in the *Monthly*

[1] United States Bureau of the Census; *Houses Owned, Mortgaged, and Rented;* October, 1921.

Labor Review, November, 1921, the average rent in 1921 was $254.94 per year, or $21.25 per month.

A further calculation was made of the average rent paid by families, of husband, wife, children aged 2, 5, and 11 years, having an income of $1300. The average amount paid for rent by these families was $167, or about $14 a month. In the cities of New York, Chicago, Philadelphia, and Boston the average amount paid for rent was $185. In St. Louis, Minneapolis, St. Paul, and Kansas City, the average amount paid for rent was $183. In cities in the northeastern part of the United States the amount was $174 and on the Pacific Coast it was $172. In the South the amount was $152 and in small towns, generally, the amount was $134.

A study of the rents recorded in the housing surveys shows an average rent, in terms of 1921 costs, of $217.70 per year, or $17.14 per month.

For comparison with the rent paid by the families as shown in the above studies there are the following standards [1] in terms of rents in 1921:

TABLE XXXI

SOME STANDARD ALLOTMENTS FOR RENT

	PER YEAR	PER MONTH
Philadelphia, Bureau of Municipal Research . . .	$360.00	$30.00
National Industrial Conference Board, Detroit . .	420.00	35.00
United States Bureau of Labor Statistics, Washington	401.20	33.43
Labor Bureau, New York	488.97	40.75

The discrepancy between the actual rent paid in the large cities as reported by the study of the United States Bureau of Labor Statistics and the standard rent given above indicates that there are many families which live in homes that do not meet adequately the requirements of decency. Such families need especially to be

[1] Taken from National Industrial Conference Board; *Research Report No. 41*, Table III.

trained to derive satisfaction and comfort from the care and decoration of the home.[1]

The low average rent of $15 as found by W. F. Ogburn and as recorded in housing surveys makes it impossible to live in a home with the sanitary requirements which we have come to associate with decent living. Ogburn's study of the differences in rent on various dwellings showed that a five-room apartment costs only 79¢ more than a four-room apartment, whereas an apartment with a bath costs $5.13 more than an apartment without bath. It is seen that rental bears a direct relation to the sanitary equipment of a home. Since it is indispensable that people shall keep their bodies and their homes clean it is necessary in certain localities to train persons to improvise sanitary appliances, such as water heaters and portable bath tubs.

II. WHAT IS A FAIR RENTAL

From the point of view of sound business policy it is important for the consumer to know what is a fair rental. Fairness to the investor, a satisfactory condition of repair, adequate housing facilities, and a wholesome business condition demand an intelligent understanding of the rent which the consumer is obliged to pay.

From a study of the replies made by realtors, the United States Housing Corporation[2] arrived at the figures, in Table XXXII, on page 104, of fair rental returns on residential properties.

The cost of the average one-family house built in 1920 was $4320. The cost of the average apartment house built in 1920 was $4169 per family. According to the figures arrived at by the United States Housing Corporation fair monthly rentals on the average house and apartment built in 1920 are $49.32 and $56.28 respectively. These figures are not suggested as a standard but rather as an illustration of intelligent calculation of a fair rent. The tenant must know that for every rented house there are the

[1] The percentage of family income paid for rent in 1921 was roughly 20% of the total. The standard selected for comparison is the Philadelphia standard of $360 for rent, which is the lowest of the four quoted above. This sum, reduced to the price level of 1910 and considered as 20% of the total income, enables us to find the income necessary to maintain a standard home. The calculation reveals that according to King's table of distribution of incomes 75% of the families of the nation could not afford to rent the Philadelphia standard home.

[2] *United States Housing Corporation Report, 1920;* page 47.

items of expense as listed in the following table which are factors in the determination of rent. The amount for each item varies and when the difference is marked it will affect the rent proportionally.

TABLE XXXII

REVENUES AND EXPENSES IN TERMS OF PERCENTAGE ON INVESTMENT

	RESIDENCES	APARTMENTS
Maintenance	1.4	1.9
Service	.5	1.6
Insurance	.2	.2
Taxes and assessments	1.4	1.5
Vacancies and bad accounts	.7	1.0
Depreciation and obsolescence	.5	.5
Administration	3.0	3.5
Total expense	7.7	10.2
Interest	6.0	6.0
Gross rental justified	13.7	16.2
Gross rental obtained	9.2	11.5
NET EARNINGS ON INVESTMENT	1.5	1.3

The tenant should know definitely what he is paying for. The cost of a house, as well as the cost of maintaining it, depends upon its location, the quality of materials used, the grade of labor employed, and the special conveniences supplied. It is important to consult the public records concerning the value of the land and the value of the house in order to decide whether a certain rental is fair or unfair. Furthermore, the public records will show whether the occupant's rent is paid for location or for other advantages.

An extremely interesting illustration of complete understanding between landlord and tenant as to the rent based upon the owner's investment is reported by Dr. George Woodward of Philadelphia.[1] The agreement guarantees to the owner 6% on his investment, out of which the owner pays for repairs on the exterior of the house.

[1] National Housing Association; *Proceedings of Annual Conference*, December, 1920, page 173.

The tenant pays the tax on the property and pays for interior repairs. The following figures were given in the report. The tenant pays:

To the owner	6% on the owner's investment
In taxes	3% on the owner's investment
For interior repairs	2% on the owner's investment
TOTAL RENT	11% on the owner's investment

An illustration of the difference in value of residential property and improvements for several pieces of real estate situated on the same block is taken from the Annual Record of Assessed Valuation of Real Estate in New York City for 1922. On one square block bounded by Park and Lexington Avenues and 90th and 91st Streets, the value of the cheapest lot is five times the value of the most expensive lot. The value of the houses on these two lots, however, differs only in the ratio of one to two. Obviously the tenant in the house situated on the more expensive lot is paying for location out of reasonable proportion. Such a mistake should not be made by a tenant when the facts are so readily obtainable.

III. RENT AND TAXES

Very often increased rent is ascribed to increased taxes. It is important for the consumer to know to what extent taxes affect rent. He should be able to check up roughly the effect of tax increase upon the cost of maintaining the house in which he lives. Below is a statement[1] of the actual cost of maintaining a house which is reliable because it is concerning a non-commercial investment:

Taxes	42%
Maintenance and repairs	20%
Water	11%
Overhead expense	19%
Miscellaneous	8%

It will be seen that taxes amount to 42% of the maintenance cost.

[1] Report of Board of Managers of Cincinnati Model Homes Co.

IV. RENT AND THE BUDGET

The data concerning the amount paid in rent given at the beginning of this chapter would indicate that a little less than the standard percentage of the budget is paid by the average family reported in the surveys. The highest per cent of the total income paid for rent as found in the more recent surveys is 18.3. The Philadelphia standard, which is the only one that furnished data for comparison, allots 20.6% of the total income for rent. Of greater importance, however, is the fact that the minimum standard for housing can be attained by a comparatively limited range of expenditure. On the other hand, the minimum standard for food and clothing can be attained by a wide range of expenditure. This is due to the variety of articles and the readiness with which the cheap and expensive articles may be interchanged without reducing food standards. It appears, therefore, that it is desirable for our people so to order their budgets as to allow for an increase in budgetary appropriation for rent at the expense of a slight decrease in the allotment for food and clothing. The importance of maintaining a high-standard home is illustrated in the following table, which shows that the infant mortality rate in 175 homes in Manchester, N. H., decreased as the amount paid in rent increased.[1]

TABLE XXXIII

RELATION OF RENT TO INFANT MORTALITY

Rent	Infant Mortality
Less than $7.50	211.4
$7.50 to $12.49	172.1
$12.50 to $17.49	156.7
$17.50 and over	100.0
Owned homes	86.0

[1] LATHROP, JULIA — *Address before American Public Health Association*, December 1, 1918.

Objectives Connected with Rent

To know what factors make high or low rent. To detect profiteering.
To know how to ascertain the cost of materials, cost of labor, interest rates, and taxes.
To ascertain the relation between rent and a standard home.
To increase the item of rent in the budget to a maximum degree consistent with the total needs of life.
To manage the home in such a way as to increase the comforts for those who must perforce live in homes below the standard.
To think sanely and honestly about the facts and remedies concerning the rent problem, as well as to gather these facts.
To inform inhabitants of homes without baths how they can purchase or construct and use sanitary appliances.
To know what per cent of the investment is a fair rental.
To ascertain in public records the investment on a house; that is, the assessed value of the land and of the house.
To know the main items of expense which determine rent.
To know whether one's rent is paid chiefly for location or for other advantages.
To know that part of the rent for which taxes are responsible.
To know when the claim that taxes are the cause of increase in rent is justifiable.
To adjust the budget so as to reduce food costs and to apportion enough money for rent to make it possible to secure a standard home.

Ventilation

In large cities where tenements predominate it is necessary to give special attention to the development of proper habits of ventilation. Rooms in tenements are smaller than the average. In the old-style tenement houses, which are still in the majority, one or two rooms have no outlet to the open air. In all tenements more than half of the rooms open on a court. In rural houses ventilation is not a problem of overcrowded rooms nor of lack of windows, but rather of stagnant and dust-laden air. The standard of ventilation agreed upon by experts is one window per room.

Of the surveys recorded in this study, the number of families having dark rooms, that is, having no window which opens to the

outer air, ranges from 10% to 54.7%. Of 3227 families investigated in Brooklyn in 1918, 52.9% lived in homes which had at least one dark room. Of 644 families investigated in Providence in 1916, 43.6% had at least one dark room.

W. F. Ogburn's figures indicate that about 45% of the families he studied were overcrowded. The surveys reported in this chapter show even greater overcrowding. The conclusion concerning ventilation to be drawn from this data is that the occupants of overcrowded homes need to cultivate the habit of keeping rooms aired properly in order to furnish comfort to the extra occupants. Of 17,380 cases of sickness in a congested district on the East Side of New York, 27% were respiratory cases due perhaps to defective ventilation.[1]

Air is charged with countless millions of dust particles; a room with open windows is comparatively free from dust. Indeed, the standard with respect to the presence of dust in air has been quantitatively determined by American engineers.[2] It is important for our purposes to know that an open window will reduce the amount of dust particles in a room.

Elaborate experiments performed under the direction of the New York State Ventilation Commission [3] reveal important facts for the householder. It was found that cool surroundings stimulated men to work. The subjects were inclined to do 63% more typewriting and 15% more physical work at 68° F. than at 73° F. The perpetual loss in money and efficiency due to overheating is indicated by 215 records of temperature in work rooms in New York, which showed that 73% were over 77° F. and 29% were over 80° F.

The effect of a stagnant room on the appetite was observed on four subjects for a period of six weeks, and four subjects for four weeks. In the former experiment each man consumed an average of 1151 calories for luncheon on stagnant days and 1308 calories on fresh-air days, an increase of 13%. In the latter experiment the average consumption on stagnant days was 1492 calories

[1] Davis, M. M. — *Health of the Immigrant.*
[2] Barker, A. H. — *Domestic Fuel Consumption, 1920*, 77.
[3] *American Journal of Public Health*, 85, February, 1915.

and 1620 calories on fresh-air days, an increase of 8.6%. A comparison of the amounts of luncheon consumed at 68° and 86° showed a slightly greater appetite at the cooler temperature.

Objectives Connected with Ventilation

To know the standard of windows for a home.
To cultivate the habit of keeping rooms aired properly.
To know the relation between dust and open windows.
To know that cool surroundings stimulate work, and to cultivate the habit of keeping a house cool.
To know the relation between a stagnant room and appetite.
To know the relation between stagnancy and comfortable temperature of a room, and to keep the room at that temperature.
To cultivate the habit of using a thermometer.
To know that a high temperature reduces the appetite.
To install ventilation devices, such as window shields and deflectors.
To use deodorizers.
To avoid drafts.
To use devices such as electric fans to keep air in circulation.

Housing Shortage

Housing shortage is a recurrent problem and requires a permanent remedy. This discussion will take for its text the present housing situation. Has the housing shortage for the great mass of people been relieved? If not, what can education do to relieve it? Based upon the Bureau of Census figures, 320,000 new structures normally take care of the need for new homes, furnishing accommodation annually for 1,600,000 people, or about 1½% of the present population. During the period from 1915 to 1918 residential construction was 42% of normal; in 1919 it was 58% of normal; and in 1920 it was 37% of normal. According to these figures the shortage in 1921 was about 1,000,000 houses. Surveys in 11 large cities made up to 1921 show housing shortages ranging from 2000 to 21,000 homes.

The great demand for homes coupled with the increased cost of building construction makes it extremely doubtful whether

the great mass of wage-earners who are at present without homes or who are inadequately housed can expect relief from building construction. In New York City the opinion expressed before the Housing Committee of the New York State Reconstruction Commission was that no speculative builder would undertake to build homes unless he could get at least $15 a room per month. If buildings could be erected on cheap land for minimum profit, the rental rate of apartments would still be too high for the highest economic level of wage-earners. The facts which demonstrate this are these: putting the percentage of rent of the workman's budget at 14.2%, which is the average of the studies, and the amount of rent at $8 per room, which is lower than any estimate given, it would require an income of $2704.22 to rent a new apartment. This figure, according to King, making due allowance for change in the value of the dollar, is above the income level of 93% of our population. For the present, the family must manage a home below standard in such a way as to get the maximum possible of comfort and happiness.

Objectives Arising from the Housing Shortage

To know that the housing shortage is a social and political problem.

To cultivate habitual thinking about the problem of housing shortage in order to help work out a solution or to act intelligently upon a proposed solution.

To become acquainted with present measures designed to reduce the shortage of houses.

CHAPTER V

HOUSEHOLD MATERIALS

It is noteworthy that the economic elements of life in the home have up to the present received comparatively little attention in the educational scheme. It was assumed, perhaps, that training for household efficiency was beneath the dignity of the school, which at best could not impart all the cultural content that the individual should master. Perhaps it was assumed that such training would proceed in the daily life of the individual. The fact remains, however, that the individual is not adequately equipped to perform the simple household tasks which are extremely essential for effective economic living for the great mass of the American people. It is our purpose here to discover what knowledge, habits, and skills pertain to mastery of the household functions.

We shall want to find out exactly what are the important articles which are used in the household. We shall want to know how they derive their importance, whether they occupy an important place in the budget, whether they affect health and comfort vitally. We shall want to discover what is wrong with the habits of consumption of the people, whether they select unnecessarily expensive materials, whether they select inferior goods, whether they are ignorant as to the relative value of materials. We shall want to ascertain the common trade practices connected with the purchase of materials, wherein these practices mislead the purchaser and wherein the consumer lacks information. We shall want to know the raw materials of the common household articles because they are a very great help in judging quality. We shall want to know the forms, units, and styles in which materials are marketed. We shall want to discover a helpful vocabulary for the purchase and use of household articles. We shall want to learn the relative costs of materials to guide us in making eco-

nomical purchases. We shall want to ascertain what will make the consumer more intelligent, efficient, and economical in the purchase and use of household materials.

The best approach to this task is by way of the census of commodities used in the household, which in effect gives one admittance into every household in the United States.

The Chief Household Commodities

The following table is a statement of the relative money value of the chief household commodities consumed in this country. At best this table gives the relative importance of these commodities as consumed in industry and in the home. It is possible only in some cases to judge the importance of the commodity as it is related to home life. What specific data can be ascertained to show the extent of the use of the common articles in the home will be discussed under each item separately. These figures were obtained by adding the value of products imported to the value of products manufactured in this country and subtracting the value of products exported from this sum. The production figures were taken from the *Summary of Census of Manufactures, 1919.* The import and export figures were taken from the Department of Commerce report on foreign commerce for 1919.

Table XXXIV

CONSUMPTION OF CHIEF HOUSEHOLD ARTICLES IN ORDER OF MONEY VALUE

Commodity	Value of Articles Consumed
Lumber and timber products	$1,363,643,294
Rubber goods	1,093,484,767
Hides, skins, leather, and leather goods	1,002,100,824
Paper, wood pulp, and paper goods	860,430,234
Furniture	564,134,274
Cottonseed oil	544,026,414
Brass, bronze, and copper products	399,767,859
Plumbing supplies [1]	300,000,000
Soap	295,855,141
Glass	235,025,839

[1] From *Crain's Market Data Book and Directory*, 345, 1922.

TABLE XXXIV — *Continued*

COMMODITY	VALUE OF ARTICLES CONSUMED
Tinware	$233,134,908
Paints	232,444,834
Phonographs	156,057,151
Stoves	143,108,248
Hardware	142,844,003
Carpets and rugs	123,253,828
Linseed oil	121,071,577
Cordage and twine	114,023,002
Tools	106,397,769
Pianos	102,429,537
Mattresses and spring beds	83,952,609
Varnishes	80,918,697
Oilcloth and linoleum	64,433,351
Trunks and valises	63,189,884
Stationery goods	58,363,244
Cutlery and edge tools	56,791,966
Oil and gas stoves	55,729,029
Turpentine and rosin	53,051,294
Watches	42,417,979
Gas and electric fixtures	42,267,953
Glue, mucilage, and paste	41,548,961
Brushes	40,291,962
Upholstering materials	39,889,711
Envelopes	39,664,077
Washing machines	39,575,496
Lamps and reflectors	38,098,917
Lime	33,862,093
Sewing machines	31,146,336
Brooms	29,912,438
Window shades and fixtures	29,196,649
Silverware	29,136,133
Saws	26,608,766
Cleansing and polishing preparations	26,356,678
Refrigerators	25,774,422
Umbrellas and canes	25,276,117
Wall paper	23,047,901
Mirrors	20,830,775
Lead pencils	20,633,694
Clocks	19,601,430
Matches	19,118,548
Fountain pens	15,884,279
Musical instruments	13,632,061
Screens and weather strips	10,932,857

Building Materials

The foregoing table is a guide to the important elements of household equipment and skill. It is seen that wood, rubber, leather, paper, oil, the metals, soap, and glass have an important rôle in the lives of the people of the nation. We must, however, analyze carefully each item as it definitely affects home life. We shall first consider building materials.

We have seen that 45.6% of the homes of our country are owned by their occupants. It is necessary for this large part of our population to know the raw materials, varieties, relative merits, and relative costs of the important commodities which enter into the building and repair of dwellings. The following table gives a picture of the place which materials occupy in the cost of building.

Table XXXV

COST OF AN IMAGINARY COMPOSITE BUILDING[1]

Item	Per Cent of Cost
Direct labor	44.0
Brick	6.1
Steel	5.9
Lumber	8.8
Plumbing and heating materials	5.8
Cement	2.6
Other materials	13.7
Overhead and profit	13.1

The foregoing table shows that the cost of labor is 44% of the entire cost of the construction of a house. On the other hand, the total cost of materials is 42.9% of the total cost. These figures indicate the saving which could be effected on some house jobs were the occupants skilled in the selection of materials and the performance of the simpler building operations. The table gives the relative importance of all building materials which enter into

[1] Prepared by Col. S. E. Thompson for the Hoover Committee on Elimination of Waste; *American Lumberman*, June 4, 1921.

what may be regarded as an average building project. It is interesting to note that while these figures are by no means representative of the items of cost of construction of the typical American home, lumber occupies the first position among materials, followed in order by brick, steel, plumbing and heating materials, and cement.

We must, however, consider the typical American dwelling. The most recent and most comprehensive report of building operations is contained in *Bulletin 295* of the United States Bureau of Labor Statistics, 1920.[1] Of all the buildings constructed in 1920, 72% were one-family houses. The inference from this is that nearly three-quarters of the occupants of these homes will be directly interested in the materials which enter into their construction, either as owners or tenants. They must pass on the durability of the materials, replace worn or destroyed materials, and, it is hoped, do repair tasks involving the materials.

Since more than 75% of all dwellings in the United States are frame,[2] it would be most profitable to ascertain the relative importance of the materials of frame construction. The following table, furnished by the Housing Bureau of the United States Department of Commerce,[3] gives the per cent cost of the several materials used in the construction of a frame house.

The United States Housing Corporation ascertained from the replies of realtors that the annual depreciation on houses amounts to 3% of the investment. On a $5000 house, this represents a yearly loss of $150. The house owner can reduce this loss by careful management and repair.[4] A reliable statement from a non-commercial housing organization puts the item of maintenance and repair at 20% of the rental of a house.[5] Again this is a figure that should be considerably reduced by attention to repairs, by the economical selection of repair materials, and by the owner's ability to perform certain household operations.

[1] *Building Operations in Representative Cities, 1920.*
[2] Gries, J. M. — *Proceedings of the American Society of Civil Engineers;* February, 1922.
[3] Taken from a letter addressed to Mr. Lawrence Veiller of the National Housing Association.
[4] Report of United States Housing Corporation, 1920.
[5] Report of Board of Managers of Cincinnati Model Homes Co. Mimeographed report in the office of the National Housing Association, N. Y.

TABLE XXXVI

RELATIVE IMPORTANCE OF MATERIALS IN CONSTRUCTION OF A FRAME HOUSE

ITEM	PER CENT OF MATERIAL COST
Lumber	45.0
Brick	4.2
Cement	3.5
Sand	2.4
Lime	2.2
Glass	2.3
Lath	2.6
Plumbing	10.3
Heating equipment	8.4
Electric equipment	3.6
Roofing	5.6
Finishing hardware	2.5
Paint and varnish	4.0
Miscellaneous	3.4
TOTAL MATERIAL COST	100.0

Lumber is by far the most important material in the construction of American homes. It is therefore important to know the common varieties of wood used in building construction, their relative durability, their special uses, and other details concerned with their purchase and use. The chief woods used in building construction in 1920 are given in the following table.[1]

TABLE XXXVII

LUMBER USED CHIEFLY IN BUILDING IN 1920

WOOD	MILLION BOARD FEET	DURABILITY[2]
Yellow pine	11,091	Intermediate
Douglas fir	6,960	Durable
Western yellow pine	2,290	Intermediate
Hemlock	1,850	Intermediate
White pine	1,500	Durable
Spruce	825	Non-durable
Cypress	625	Very durable
Redwood	477	Very durable

[1] *Crain's Market Data Book and Directory;* 1922; page 263.
[2] United States Bureau of Standards; *Circular No. 70,* page 50.

The foregoing table gives the chief woods used in building construction, and therefore the varieties with which the average occupant of a house ought to become acquainted. Since the lumber item is so large it is important that durable wood be purchased for construction. From the table we see that the wood selected for building construction is chiefly of intermediate quality, only a small fraction being non-durable wood.

I. LUMBER

The purchase of lumber is a complex affair. There is a fairly simple grading scheme with which the consumer can become acquainted. He should also know the standard sizes in which lumber is sold. The standards are universally adhered to by lumber men. The grades, which depend upon the number of defects in the lumber, determine the price of wood. The common and serious defects are knots, shakes, checks, warping, and rot. The consumer should be able to identify these defects and to determine to what extent they affect his particular use of the lumber.

Experience has taught that certain woods are most suitable and economical for the different parts of the house. The selection of wood, especially for replacement and repair, should be guided by a knowledge of what will serve best for a particular purpose. One book [1] recommends the following lumber, to give satisfactory service for the several purposes:

Purpose	Species of Wood
Light framing	Spruce, white pine, yellow pine
Beams and girders	Yellow pine, oak, chestnut, cypress
Siding and exterior finish	White pine, cypress, yellow pine, redwood
Roof boards and sub-floors	The cheaper soft woods
Shingles	Cedar, redwood, cypress
Flooring	Oak, maple, yellow pine, fir, birch
Doors	White pine, yellow pine, yellow poplar, cypress
Window frames	Cypress, fir, hemlock, white and yellow pine
Interior finish	Oak, maple, mahogany, redwood, gum, white pine, cherry, ash, birch, sycamore

[1] Churchill, A. L., and Wickenden, L. — *The House Owner's Book*, 21.

Purpose	Species of Wood
Cupboards	White and yellow pine, elm, hemlock, cypress, gum
Draining boards	Elm and cypress
Shelves	White and yellow pine, cypress, hemlock, gum

There are also several other common facts pertaining to lumber which are very useful to know. For example, hardwoods warp more readily than softwoods, and are thus rendered unsuitable for doors, sashes, window frames, and kitchen tables. Sapwood is less durable than heartwood. Heartwood is usually darker than sapwood.

In order to build, to contract for building, to repair, to supervise repair or construction, to purchase lumber for repair or construction, or even to discuss or to understand the discussion of wood used in building, it is necessary to acquire its vocabulary. The most common terms used are: *sill*, *joist*, *girder*, *corner post*, *girt*, *roof-plate*, *stud*, *bridging*, *brace*, *cap*, *sole*, *splice*, *butt joint*, *mortise and tenon joint*, *cleat*, *doweled joint*, *framing*, *siding*, *rafters* and *sash*. These terms should be understood by every person.

II. BRICK, CEMENT, AND GLASS

Of the building materials, brick is of second importance. We include here tile, terra cotta, and fire-clay products. Measured in terms of money value the consumption of brick is well up toward the front, ranking with glass, tinware, and paints. In 1919 the United States consumed brick, tile, terra cotta, and fire-clay products to the value of $208,422,920.

The common building practices with respect to structural clay products and their relative importance is illustrated by the following table, giving production figures in dollars for 1920, as determined by the United States Geological Survey.[1] The table shows that common brick ranks first in importance. Hollow building tile is consumed to the value of less than one-third that of brick, but is steadily coming into more use. The table follows:

[1] *Crain's Market Data Book and Directory*; 1922; page 77.

TABLE XXXVIII

PRODUCTION OF BRICK AND CLAY PRODUCTS, 1920

PRODUCT	VALUE
Common brick	$81,330,000
Fire brick	52,750,000
Hollow building tile	25,900,000
Face brick	19,050,000
Architectural terra cotta	9,400,000

It is essential to have a general idea of the prices of these materials and to know how these commodities may be ordered. In June, 1921, common brick was sold at $19.50 per thousand, face brick was sold at $35 per thousand, and hollow tile was sold at 20¢ per linear foot. The particular advantages of hollow tile are that they reduce dampness, they make the house warmer in winter and cooler in summer, and they are laid up more cheaply than bricks. Plain tiles are easily cleaned, resist the action of cleaning solutions, and are durable.

The remaining important building materials which are not discussed elsewhere in this study are sanitary ware, cement, sand, and lime. The extent of consumption of these materials in 1919 is given in the following table:

TABLE XXXIX

CONSUMPTION OF SOME BUILDING MATERIALS

MATERIAL	VALUE
Sanitary ware	$ 21,480,000
Cement	167,820,000
Sand	9,303,734
Lime	33,862,093

These materials are used for building and repair, and one should know their approximate prices and the units in which they are sold. In June, 1921, Portland cement was sold at $3 per barrel, sand was sold at $2.25 per cubic yard, and lime was sold at $26 per ton.

Lime, sand, and cement are extremely useful materials and knowledge of their use needs urgently to be extended. Lime has very wide use around the house and should be kept continuously. Lime is used in mortar, as a fertilizer, for spraying trees, as a disinfectant, as a deodorizer, and as an insecticide. The common defects in the home which call for the use of cement are cracks in concrete basement floor; loose joints in brick, tile, and stone; loose plaster. The common construction problems which require a knowledge of cement are the construction of walks, steps, driveways, fence posts, and foundations for outbuildings.

Most of the glass goods made find their way into the home. Glass is among the most important household commodities, ranking ninth in value of goods consumed. In certain respects the purchase of glass is one of the simplest of the marketing problems in the home. There are only two important kinds of building glass, namely, plate glass and common glass. Obscured glass and wired glass are relatively unimportant. The best window glass is the polished plate glass, which is even, thick, strong, and keeps out the cold air. It is soft and readily scratched. Common glass comes in two thicknesses only. Single-strength glass is about one-twelfth of an inch thick. Double-strength glass is about one-eighth of an inch thick. While single-strength glass is flatter and freer from defects, double-strength glass is four times as strong and keeps out the cold air better.[1] In spite of this fact, the American Window Glass Company reports that single-strength common glass has been mostly used in housing operations.[2]

The comparative importance of glass products is illustrated in the following table:[3]

[1] Clark, T. M. — *The Care of a House*, 257; 1909.
[2] *American Architect*, CXIII, 648.
[3] *Crain's Market Data Book and Directory*; 1922; page 93.

TABLE XL

RELATIVE IMPORTANCE OF GLASS PRODUCTS

GLASS	VALUE, DOLLARS
Building glass	
Window glass	41,106,000
Plate glass	33,519,000
Obscured glass	4,300,000
Wire glass	2,907,000
Pressed and blown glass	70,708,000
Bottles, jars, etc.	87,762,000

Objectives Concerning Building Materials

To know the chief raw materials of building construction and repair.

To know the relative importance of brick, steel, lumber, and plumbing and heating materials in building construction.

To choose lumber with one's builder or carpenter.

To know the common woods used in building construction and their appropriate uses.

To select wood for interior finish.

To know the relative durability of woods used in building construction.

To identify yellow pine, Douglas fir, western yellow pine, hemlock, spruce, cypress, and redwood.

To know the grading scheme for lumber.

To know the standard sizes in which lumber is sold.

To recognize the common defects in lumber, such as knots, shakes, checks, warping, and rot, and to determine to what extent these defects affect one's particular use of the lumber.

To know the most suitable wood for light framing, beams and girders, siding and exterior finish, roof boards and sub-floors, shingles, flooring, doors, window frames, interior finish, cupboards, draining boards, and shelves.

To know that hardwoods warp more readily than softwoods.

To understand the following terms used in building construction: *sill, joist, girder, corner post, girt, roof-plate, stud, bridging, brace, cap, sole, splice, butt joint, mortise and tenon joint, cleat, doweled joint, framing, siding, rafters, sash, lath, shingle, tongue, groove, board foot.*

To know the appropriate uses of common brick, fire brick, hollow building tile, face brick, and architectural terra cotta.
To know their relative value as building materials.
To know their relative cost and how they may be ordered.
To identify earthen and porcelain sanitary ware and to know their appropriate uses.
To know the approximate prices of cement, sand, and lime, and how they may be ordered.
To keep a continuous stock of lime and to use it as fertilizer, disinfectant, deodorizer, insecticide, and in making mortar and plaster.
To use cement for cracks in basement floors; loose joints in brick, tile, and stone; and loose plaster.
To have such knowledge of cement as is necessary for the construction of walks, steps, driveways, fence posts, and foundations for outbuildings.
To recognize window glass and plate glass and to know their relative values.
To know the two thicknesses in which window glass comes.
To know the relative value and cost of single-strength and double-strength window glass.

Furniture

I. The chief furniture woods

What common woods enter into the making of furniture? Is there a general misunderstanding as to the quality of furniture which is commonly purchased? The furniture manufacturers of the country consumed 1,400,000,000 board feet of lumber in 1920. The industry is the fourth largest consumer of wood products, being surpassed by boxes and crates, building and construction, and planing mill products industries. The American Hardwood Manufacturers' Association collected data on the consumption of hardwood in 1920 from 202 manufacturers of furniture, who consumed 274,988,000 board feet of the various species of hardwood. These data[1] show that more than half the furniture of the country, judging from the manufacturers who reported, is made of mixed oak, sap gum, and red gum. Of the remainder, more

[1] *Crain's Market Data Book and Directory;* 1921; page 193.

than half is made of white oak, maple, birch, chestnut, and poplar. Following these in order of importance are red oak, pine, walnut, beech, elm, mahogany, and basswood.

The average consumer has no notion of the materials which commonly go into the manufacture of a chair, a bookcase, and the like. The chief kinds of wood used in the manufacture of certain articles of furniture are given below, on the basis of figures obtained from manufacturers in connection with the inquiry reported above. Again there is a dearth of the more highly valued species of wood. Bookcases are made chiefly of sap gum and birch. Kitchen cabinets are made chiefly of mixed oak and sap gum. Phonographs are made of a variety of wood, but mahogany and oak enter only slightly into their manufacture. Chairs, which get harder usage than other articles of furniture, are made chiefly of maple, and also of white oak, birch, beech, elm, and sap gum.[1]

We hear much talk of mahogany and walnut furniture and advertisements proclaim them above all other woods. Our data, however, show that of all woods used by furniture manufacturers, mahogany comprises a little over 1% and walnut a little over 2%. An investigation of trade practices reveals the fact that birch can be finished like mahogany and that gum wood is manufactured to appear like walnut. Our data show that whereas mahogany and walnut are used in about 3% of the furniture, birch and gum, which can be made to appear like the former, are used in 36% of all the furniture. It is therefore obvious that it is important to be able to distinguish birch from mahogany and gum wood from walnut. It is noteworthy that the Retailers Furniture Association at its annual meeting in July, 1921, passed a resolution urging the furniture manufacturers to discontinue the use of gum and poplar as soon as practicable, except in the lower grades of furniture.

There are other trade practices, the ignorance of which is a great hindrance to proper selection and purchase of furniture. The practice of putting a veneer of expensive wood over a foundation of durable but less expensive wood has its advantages, but

[1] *Furniture Manufacturer and Artisan*, LXXXIII, 74.

should be known by the purchaser. The common practice of printing the grain of quartered oak on other woods can be very deceiving, particularly to the workingman, unless he learns to distinguish the print from the genuine quartered oak.

The use of misleading names in the selling and advertising of furniture has led the Vigilance Committee of the Associated Advertising Clubs of the World to draw up a set of furniture definitions [1] which are based upon those adopted by the National Council of Furniture Associations. The standards suggested should serve as a guide to the household consumer of furniture. The terms follow:

AA *Solid throughout* shall apply to furniture which is made entirely of the wood designated.

A *Solid exterior* shall apply to furniture of which all the exposed parts are made of the wood designated.

B *Built up* shall apply to furniture all the exteriors of which are made of the kind of wood designated, except case back, case bottom, and mirror back.

C *Combination* shall apply to furniture of which the tops, drawer-fronts, door fronts, doors and ends are of built-up stock or solid wood of the kind designated.

D *Finish* shall be used only in connection with name of the wood of which the furniture is made, such as *gum wood, walnut finish.*

In order to compare the prices paid by the families included in the survey of the United States Department of Labor with prices of medium-price furniture, during the same year, the writer went through the files of the *New York Globe* for August, 1918. The month of August was selected because it is the period of annual furniture sales and prices could be found in abundance. Incidentally, a tabulation of the names of furniture woods mentioned in the advertisements was made. This table is an interesting reflection of dealers' practices and popular ignorance about furniture. It has been shown that mahogany and walnut are used in

[1] *Furniture Manufacturer and Artisan*, LXXXIII, p. 55 of advertising section.

about 3% of the furniture, and birch and gum, finished to appear like mahogany and walnut, are used in 36% of the furniture. We should expect therefore that some similar proportion should appear in advertisements. The facts, however, are startling. Mahogany is advertised 149 times, walnut is advertised 69 times, birch with mahogany finish is mentioned twice, and gum wood with walnut finish is mentioned 3 times.

It was plain from these advertisements that they were designed deliberately to mislead the purchaser or to exploit his ignorance of furniture woods. Only rarely was it clear whether mahogany meant solid mahogany, veneered mahogany, or a mahogany finish on birch wood. The term mahogany veneer was mentioned only 6 times, and the term mahogany finish was mentioned 13 times.

II. THE QUALITY OF FURNITURE

We wish now to ascertain what quality of furniture the American people buy in terms of money value. The United States Department of Labor publishes a table of expenditures for furniture and house furnishings in connection with a study of the cost of living in the cities of the United States. The figures given are a tabulation of data secured from 6180 families in 36 northern cities. The incomes of these families ranged from $900 to $2500.[1] It is plain from this table that the quality of furniture bought by the families studied was too poor to be economical in the long run. The limited means of the great mass of our people makes it impossible to make large expenditures for good grades of furniture, but it is eminently desirable that the budgetary habits of our people should be adjusted to improve this condition to a degree. As indicated in connection with rent the purchase of such permanent equipment as furniture should be made at a sacrifice of the less permanent things, the cheaper qualities of which satisfy the fundamental needs and the purchase of which may be discontinued when the family is ready to renew the purchase of better qualities.

In order to compare the quality of furniture purchased by the American people with a medium grade commonly sold, the follow-

[1] United States Bureau of Labor Statistics; *Monthly Labor Review*, January, 1920, page 31.

ing table is presented. In one column the average price per article reported in the study of 6180 families is given, and in another column a medium price of the same article as advertised in the *New York Globe* for August, 1918, about the same time the family study was made. The articles mentioned in the table are the most important furniture commodities bought for the home. It is clear that these families, illustrative of the great mass of American people, are purchasing furniture very much inferior to the medium grade.

TABLE XLI

RELATION OF PRICES REPORTED IN BUREAU OF LABOR STUDY WITH MEDIUM PRICES ADVERTISED IN *New York Globe* DURING THE SAME PERIOD

ARTICLE	REPORTED BY BUREAU OF LABOR	MEDIUM PRICE, *New York Globe*
Chair	$ 4.28	$ 8.00
Table	11.88	15.00
Couch	23.58	50.00
Bureau	14.80	20.00
Sideboard	23.93	35.00
Bedstead	11.68	20.00
Mattress	8.18	16.00
Refrigerator	15.16	28.00

We have seen that, as viewed from the standpoint of money value, the American people consume furniture which is poor in quality and is wasteful in the end. Fortunately, it is possible to determine the degree of durability of the woods used by American furniture manufacturers. It is interesting to see whether the results of the durability inquiry will agree with the financial inquiry.

The United States Bureau of Standards, in an invaluable circular,[1] publishes a table giving the relative durability of common woods. The common woods are classified according to degree of durability as very durable, durable, intermediate, and non-durable. Using the table of furniture woods consumed by Ameri-

[1] United States Bureau of Standards, Circular No. 70; *Materials for the Household*, 50.

can manufacturers, we can place the grade of durability after each wood mentioned in terms which are unmistakable. A summary of this procedure shows that 9% of the wood used is very durable, 35% is durable, 18% is intermediate, and 38% is non-durable. That is, 56% of the wood which enters into the furniture used by the American people is not durable.

TABLE XLII

DURABILITY OF 16 CHIEF WOODS USED BY 202 FURNITURE MANUFACTURERS IN 1920, IN ORDER OF QUANTITY CONSUMED

WOOD	DURABILITY	QUANTITY CONSUMED M BOARD FEET
Oak, mixed	durable	72,150
Gum, sap	non-durable	56,767
Gum, red	intermediate	25,747
Oak, white	durable	17,923
Maple	non-durable	17,521
Birch	non-durable	13,605
Chestnut	very durable	13,580
Poplar	intermediate	10,036
Oak, red	intermediate	8,079
Pine	intermediate and durable	6,393
Walnut	very durable	5,984
Beech	non-durable	4,773
Elm	non-durable	4,558
Mahogany	very durable	3,612
Basswood	non-durable	3,366
Ash	intermediate	1,661

TABLE XLIII

DURABILITY OF WOOD USED BY 202 AMERICAN FURNITURE MANUFACTURERS IN 1920

DURABILITY	NUMBER OF M BOARD FEET	PER CENT
Very durable	23,176	9
Durable	93,269	35
Intermediate	48,719	18
Non-durable	100,590	38
TOTAL	265,754	100

The Bureau of Labor study of furniture expenditure includes a table of the average annual expenditure for six income groups. This table indicates that the amount and quality of furniture which a family buys depends upon the income of the family. There is no criticism of such a condition if all the families are in the habit of buying a good grade of furniture. This, we have seen, is not the case. The fact is that the low-income families, which are most in need of purchasing a good grade of durable furniture, are buying that furniture which, in the long run, is most expensive.

TABLE XLIV

TOTAL AVERAGE EXPENDITURE FOR FURNITURE AND HOUSE FURNISHINGS OF 6180 NORTHERN FAMILIES [1]

INCOME	NO. OF FAMILIES	AMOUNT
Under $900	163	$ 30.60
$900–1200	1322	45.60
$1200–1500	2155	58.70
$1500–1800	1329	80.26
$1800–2100	720	91.65
$2100–2500	316	111.37
$2500 and over	175	121.70
ALL INCOMES		68.12

Objectives Connected with the Purchase and Use of Furniture

To know the common woods which enter into the furniture of the nation, namely; oak, sap gum, red gum, maple, birch, chestnut, and poplar.
To know the relative cost of the chief furniture woods.
To know the best lumber to ask for in the purchase of a bookcase, kitchen cabinet, phonograph, and chair.
To distinguish birch from mahogany.
To distinguish gum wood from walnut.
To identify a veneer.
To identify the print of quartered oak on cheaper woods.

[1] United States Bureau of Labor Statistics; *Monthly Labor Review*, January, 1920, page 318.

To distinguish furniture which is made entirely of the wood designated; furniture of which all the exposed parts are made of the wood designated; furniture all the exteriors of which are made of the kind of wood designated, except case back, case bottom, and mirror back; furniture of which the tops, drawer fronts, doors, and ends are of built-up stock or solid wood of the kind designated; furniture of cheap wood with the finish of a more expensive wood.

To avoid being misled by furniture advertisements.

To adjust the budget so as to be able to buy durable furniture instead of cheap furniture.

To buy cheaper quality of less permanent things to enable one to purchase good furniture.

To know the relative durability of the chief furniture woods.

To know what constitutes a complete equipment of furniture in the dining room, living room, bedroom, and kitchen.

Paint and Varnish

In money value the national consumption of paint and varnish is a little more than that of soap, which ranks eighth in order of household commodities. Although it is commonly known that paint is a decorative material, it is not widely known that paint is perhaps equally important as a protective substance. Nor is the sanitary property of paint well known. Writers have made estimates of loss of wood, iron, and other materials due to lack of paint, but no reliable study has been made to ascertain this loss more accurately. It is safe, however, to assume that a considerable amount of decay and deterioration could be avoided by a wider use of paint as a protective coating.

The consumer should be able to distinguish paint, stain, and varnish. Paint is a mixture of a solid coloring substance and oil, usually linseed, which when applied to a wood or metal surface leaves a solid, opaque coat. The solid is called the pigment and the liquid the vehicle. A stain contains less pigment than a paint and therefore only partly obscures the surface to which it is applied. Varnish is a mixture of fluids or liquids which contain no pigment, and leaves a thin, transparent layer on the surface to which it is applied.

Much practical information concerning the selection, mixing, and use of paints is available in simple language especially for the household consumer. The important paint and varnish ingredients with which every person should have some familiarity are recorded in the table of commodities belonging to the paint and varnish industry, published by the War Industries Board.[1]

TABLE XLV

CONSUMPTION OF CHIEF PAINT AND VARNISH COMMODITIES, 1917

COMMODITY	MILLION UNITS
Oils	
Linseed oil, gal.	28.0
Soya bean oil, gal.	28.0
China wood oil, lbs.	41.0
Pigments (white)	
Basic lead carbonate (white lead), lbs.	230.0
Lithopone, lbs.	130.0
Zinc oxide, lbs.	100.0
Basic lead sulphate, lbs.	25.0
Extending pigments	
Litharge, lbs.	88.0
Barytes, lbs.	75.0
Colored pigments	
Lampblack	85.0
Red lead, lbs.	51.0
Boneblack, lbs.	45.0
Ocher	30.0
Venetian red, lbs.	17.0
Chrome green, lbs.	9.0
Paris green, lbs.	9.0
Chrome yellow, lbs.	7.0
Ultramarine blue	5.0
Umber, lbs.	2.0
Prussian blue, lbs.	1.5
Varnish materials	
Rosin, lbs.	200.0
Copal gum, lbs.	24.0
Dammar gum, lbs.	9.0
Kauri gum, lbs.	7.0
Ready-mixed paints, gal.	40.0
Varnish, gal.	40.0
Shellac, lbs.	27.5

War Industries Board, Price Bulletin No. 44; *Prices of Paints and Varnishes*, 24.

The materials listed in the preceding table are the chief ingredients of paint and varnish. It is important to know something about them to order them intelligently for use in the home, or in order to ascertain their value from the dealer, or in conversation with a painter or contractor. It is seen that the chief oils used are linseed oil, soya bean oil, and china wood oil. For use in the home linseed oil is most common. In mixing paints it is safest to acquire the habit of using a formula, because the proportion of oil in a gallon of paint varies. In order to avoid substitutes it is important to become familiar with the mild, characteristic odor of linseed oil and its pale straw to amber color. The purchaser should avoid cloudy sediment, which renders the oil imperfect.

The choice of pigment in mixing paint is more difficult as one can judge from the variety listed in the table. The white pigments are most extensively consumed. Basic lead carbonate or white lead is the most important and most commonly used white pigment. Next in importance is zinc oxide. The so-called French-process zinc oxide is superior to the American-process zinc oxide. Zinc oxide and white lead are very often combined and are considered by some to be superior to either of the white pigments. Lithopone is used chiefly for indoor work because it does not wear well for outside exposure and because it gives a good finish. Since it is difficult and unsatisfactory to mix dry pigments with a vehicle, white lead, red lead, and zinc oxide are sold in paste form, being previously ground in a small amount of oil.

To get paint of any color it is only necessary to add a small quantity of the proper colored pigments. The most important of the colored pigments are limited and can easily be learned by color. Gray tints are made by adding lampblack or boneblack; buff tints are made by adding a mixture of ocher and umber; brown tints are made by adding a mixture of black and red; yellow and cream tints are made by adding ocher or chrome yellow; blue tints are made by adding Prussian blue or ultramarine; red tints are made by adding red lead or Venetian red; green tints are made by adding chrome green or Paris green. For pro-

tecting iron and steel against rust, red lead paint is most frequently used. The oxides of iron, commercially Venetian red, make a cheap and satisfactory paint for other purposes. The colored pigments are sold in paste form. When it is necessary to thin a paint down, turpentine or benzol are added, the latter being the cheaper of the two. To accelerate drying, a drier, usually consisting of solutions of lead or manganese salts in turpentine, is added.

I. READY-MIXED PAINT

The consumption table of paint commodities shows that 40,000,000 gallons of mixed paint were consumed in 1917. Ready-mixed paints are not always reliable. It is here that the large quantities of fillers and substitute pigment are used. Water is sometimes used in ready-made paints. The uncertainty of purchasing ready-mixed paints is illustrated by an analysis made in the laboratory of the United States Bureau of Chemistry of two samples of white paint bought at the same time and at the same price.[1] The one was made of inferior ingredients and could be mixed at a cost of 78¢; the other was of ingredients of good quality, the value of which was $1.41. The purchaser in this case had no way of distinguishing between the good and the poor quality in the can. When the ingredients are specified it is important to identify those which are satisfactory. The buyer of ready-mixed paints should be able to calculate the maximum price for a white mixed paint and to a limited extent any other paint by ascertaining the market price of white lead and linseed oil. The common ready-mixed paints which are sold are oil paints; varnish paints, really enamels, made of pigments and varnish; stains; and floor paints, which are oil paints to which hard drying varnish has been added.

II. VARNISH

A good varnish commonly consists of linseed oil, light-colored hard gum, a chemical drier, and turpentine. Oil gives durability

[1] United States Department of Agriculture, *Farmers' Bulletin No. 474;* November 29, 1911; page 16.

to varnish and therefore more of it goes into varnish for outdoor use. Gum, however, gives a bright gloss and more of it is used in indoor varnish. Since indoor varnish should dry quickly more chemical drier is used for this purpose. In the cheaper varnishes, rosin and the soft gums, dammar chiefly, replace copal and kauri gum, and benzol replaces turpentine.

It is important for the consumer to be familiar with the principal kinds of commercial varnish commonly sold. Furniture varnishes are rich in hard gums. The cheaper grades contain cheap gums or substitutes and are soft, not durable, and turn white easily in dampness or when knocked or scratched. Spar varnish is very rich in oil and therefore is especially suited to outdoor uses. Shellac varnishes dry quickly and give a bright gloss. Since they contain no oil they are very brittle. Copal varnish is made of copal gum and linseed oil and is excellent for general use. Dammar varnishes contain no oil, are very white, do not dry hard, and soften under heat. Dammar and shellac varnishes are known as spirit varnishes as distinct from oil varnishes. In the spirit varnishes, alcohol, turpentine, and benzol act as does the oil in an oil varnish.

III. PAINTS AND LIGHTING

When the lighting effect is an important factor in the selection of paints it is important to select such pigments as have the largest reflection values. The following tables give the reflection values of certain white pigments and of several common interior pigments.

TABLE XLVI

REFLECTION VALUE OF SOME WHITE PIGMENTS [1]

PIGMENT	COEFFICIENT OF REFLECTION
Lithopone (Grade A)	81
Zinc oxide (French process)	78
Zinc oxide (5% lead)	77
Lithopone (Grade B)	69
White lead (Type A)	67
White lead (Type B)	50

[1] *Chemical and Metallurgical Engineering*, XXV, 591.

TABLE XLVII

REFLECTIVE VALUES OF COMMON INTERIOR COLORS [1]

COLOR	COEFFICIENT OF REFLECTION	COLOR	COEFFICIENT OF REFLECTION
Light cream	66	Medium terra cotta	39
Light pink	60	Light greenish blue	36
Light yellow	58	Medium blue	32
Light blue	55	Warm green	19
Light greenish yellow	54	Medium green	14
Light buff	52	Red	12
Light green	42	Dark blue	12
Light terra cotta	41	Green	11

NOTE: In addition to the references already given, this section is based upon the following principal sources:

United States Bureau of Standards, *Circulars 69, 89, 97, 111.*

The Paint and Varnish Making Industry in Philadelphia; Philadelphia Chamber of Commerce.

Objectives Concerning Paint and Varnish

To learn that paint is a protective and sanitary product.
To use paint to protect wood, metals, and other materials.
To distinguish paint, stain, varnish, and enamel.
To know the common ingredients of paint and varnish.
To become familiar with the sources of formulæ for paint and varnish.
To identify linseed oil.
To select the proper pigment.
To know the relative value of the four wnite pigments.
To learn the trade names of the important colored pigments.
To become familiar with the thinners, turpentine and benzol.
To become familiar with lead and manganese driers.
To mix paints in the home.
To avoid being misled when purchasing ready-mixed paints.
To distinguish ingredients of good quality from those of inferior quality.
To calculate the probable cost of good ready-mixed paints from the market price of the ingredients.
To know the variety of ready-mixed paints which are sold.
To know the ingredients of a good varnish and to order it by specifying the basic ingredients.

[1] *Building Age*, XLII, 61; May, 1920.

To order varnish properly for indoor and outdoor purposes.
To become familiar with furniture varnish, spar varnish, shellac varnish, Dammar varnish, and copal varnish and to know their appropriate uses.
To select the proper white pigment for maximum illumination.
To know the illuminating quality of the common interior colors.
To select paint for indoor and outdoor purposes properly.

Metal Products, Tools, and Hardware

The sum total of hardware, tools, and cutlery produced in this country is over three hundred million dollars in value and is well up in front among the most important household commodities. A very helpful picture of national use of hardware and tools is furnished in connection with a price study made by the War Industries Board.[1] The investigators collected data to show the quantity of important iron and steel products produced in 1917. Among these products are the following which concern us at present:

Table XLVIII

QUANTITY OF CERTAIN IRON AND STEEL PRODUCTS, 1917

Item	Number
Axes, single bit, base weight, first quality	5,760,000
Braces, common ball	700,000
Chisels, 1 inch	1,250,000
Carvers, stag handle, 8 inch, pair	300,000
Knives and forks, cocobolo handles, metal holster	6,048,000
Files, 8 inch, dozen	5,000,000
Hammers, Maydale, No. 1½	6,000,000
Locks, common mortise, knob lock, 3½ inches	10,000,000
Padlocks	2,400,000
Nails, cut, eight penny, fence, and common, 100-pound kgs.	18,800,000
Nails, wire, eight penny, fence, and common, 100-pound kgs.	18,000,000
Planes, Sargent, No. 414 jack	460,000
Saws, hand, Disston No. 8, 26 inch, skew back	1,920,000
Shovels, Ames No. 2	5,880,000
Spoons, tinned iron, table, dozen	1,992,000

[1] United States War Industries Board, *Price Bulletin No. 33*, page 43.

In discussing building materials it was demonstrated that the maintenance and repair of the house under hired labor is 20% of the total cost of the upkeep of a house, and further, that depreciation amounts to 3% of the investment in a house. Add to this the repair work on household articles and other construction jobs, and the importance of the possession and purchase of tools becomes an important factor. In the preceding table several important household tools were not listed. A complete list of tools necessary in the home includes hammer, handsaw, backsaw, miter box, plane, chisel, brace and bits, try square, folding rule, nail set, oil stone, vice, hack saw, soldering copper, pliers, screw driver, monkey wrench, file, glass cutter, and ax.

The metals which enter into tool making are cast-iron, malleable cast-iron, and steel. Cheap tools are made of cast-iron. Malleable cast-iron is often sold as steel or semi-steel in many tools, particularly hammers.[1]

I. BRASS, BRONZE, AND COPPER PRODUCTS

According to the census report for 1919, brass, bronze, and copper products occupy an important place among the goods consumed in this country. Such goods were consumed to the value of $399,767,859 in 1919. The household consumer comes in contact with brass, bronze, and copper products through the purchase and use of hardware, lamps, and gas and electric light fixtures. The value of hardware products made of these metals was $42,206,580 in 1919, which includes the products consumed by industry.

Investigation reveals several important facts concerning these products upon which our educational objectives will be based. Solid brass and bronze do not rust. Therefore they make excellent materials for door knobs, hinges, window catches, plumbing fittings, bathroom fittings, which are affected by dampness or rain. Doors and bathrooms are thus affected and should be fitted with brass or bronze. Inconvenience and discomfort in

[1] United States Bureau of Standards, *Circular No. 70*, page 64.

the use of windows and doors are often traced to defective hardware. Poor pulleys often cause windows to stick, cords to break, and sashes to remain open.

Much that is sold for brass and bronze is iron or steel coated with a thin layer of brass or bronze. When this layer wears out rusting cannot be prevented. Scraping and the general appearance of an article reveal its quality. Brass and bronze are very durable, and very often the initial high cost proves to be an ultimate economy.

Objectives Concerning Metal Products, Hardware, and Tools

To purchase and keep a hammer, handsaw, backsaw, miter box, plane, chisel, brace and bits, try square, folding rule, nail set, oil stone, vice, hack saw, soldering copper, pliers, screw driver, monkey wrench, file, glass cutter, and ax.

To distinguish cast-iron, malleable cast-iron, and steel, which are the metals of which tools are commonly made.

To identify wrought iron and know its relative cost and when it is used.

To know the relative durability of cast-iron, wrought iron, malleable cast-iron, and steel.

To recognize good quality in table cutlery, razors, pocket knives, scissors, and shears.

To select brass or bronze for door knobs, hinges, window catches, plumbing fittings, and bathroom fittings.

To distinguish solid brass and bronze from iron or steel with a brass or bronze coating.

To know the relative cost of steel, brass, and bronze.

To know their relative merits as hardware articles.

To know the relative cost of brass and bronze articles.

To know the standard kinds, sizes, forms, and grades of files, chisels, nails, bits, and sandpaper, and how to order them.

Paper Products

Paper products are very commonly used in the household. Newspapers, books, magazines, placards, boxes, wrapping paper,

writing paper, and containers are some common paper articles. The materials which enter into paper products in this country and which determine their quality are wood pulp 57%; old paper 30%; rags 6%; and straw 5.5%.[1] The products of the paper industry are distributed as follows:[2]

TABLE XLIX

PAPER PRODUCTS

PRODUCT	PER CENT	PRODUCT	PER CENT
News print	20.	Writing paper	5.0
Cardboard	30.	Tissue paper	2.0
Book paper	15.	Hanging paper	1.5
Wrapping paper	15.	All other paper	3.0
Building paper	7.5		

While paper is of considerable economic importance, the average consumer exercises very little selection in the purchase and use of papers. Writing paper, and to a limited extent wrapping paper and bristol board, are the only items in this group which the consumer selects personally. These items comprise only a very small portion of the output of paper products. However, writing paper alone was produced to the value of $130,000,000 in 1920.[3] Much of what is called writing paper is consumed by the printing industry. Fine writing paper is made of rags, and medium- and low-grade writing paper consists partly or wholly of chemical wood. The following specifications illustrate the simple, useful facts which will help the consumer to purchase paper more intelligently. There are but two variables in this group which determine the quality of each article.

[1] United States Bureau of Standards, *Circular 107;* page 6, figures for 1918.
[2] *Crain's Market Data Book and Directory;* 1922; page 339.
[3] Statement of American Paper and Pulp Association to Ways and Means Committee, House of Representatives, January, 1921.

TABLE L

SPECIFICATIONS FOR PAPERS [1]

PAPER	PER CENT RAG	PER CENT CHEMICAL WOOD
Ledger paper, first grade	100	
Ledger paper, second grade	75	25
Parchment	100	
Bond and letter papers, first grade	100	
Bond paper, second grade	50	50
Writing paper, medium grade	60	40
Writing paper, low grade		100
Bristol board, first grade	50	50
Bristol board, second grade		100

A guide to the durability of paper when this quality is the chief consideration is furnished in the following table.[2] It is seen from the table that the weight of paper is a good indication of its strength and that rag papers are stronger than wood-pulp papers.

TABLE LI

TEARING STRENGTH OF VARIOUS PAPERS

KIND OF PAPER	WEIGHT OF REAM POUNDS, 24 × 36	TEARING STRENGTH GRAMS
News sheet	28	17
Steamed groundwood (brittle)	34	21
Tough kraft (soft feel)	41	80
Hard kraft (tinny feel)	52	73
Litho (bleached sulphate)	44	83
Bond (all rag)	38	88
Ledger (all rag)	87	167

In order to purchase paper intelligently it is necessary to know the common varieties, sizes, quantities, and finishes which are sold. The consumer should be able to identify bond, linen, ledger,

[1] United States Department of Agriculture, *Report No. 89; Durability and Economy in Papers for Permanent Records*, 45, 46, 47, and 50; 1909.

[2] United States Forest Service, Forest Products Laboratory; *Technical Notes No. 97.*

and parchment writing papers. He should be able to identify manila, kraft, tag, paraffin, and vegetable-parchment wrapping papers. He should know that kraft paper is the strongest; that tag is for rough usage; that paraffin is for food products; and that vegetable parchment is grease proof. He should know that writing paper can be bought in regular, linen, and ripple finish. Much of what is sold for linen or linen-finish paper is made of wood pulp with the design of the linen fabric pressed on it. Many people think that the polite way to buy better paper and envelopes is in decorated boxes containing twenty-four sheets of paper and twenty-four envelopes. Little do they know that the best papers are not sold in that way. Paper bought thus is twice as costly as paper bought by the pound or ream.[1]

Objectives Concerning Paper Products

To know the chief materials which enter into paper products.
To distinguish rag from wood-pulp writing paper and bristol board.
To know the relative durability of common papers.
To know the varieties of writing and wrapping paper.
To know the appropriate uses of the several papers.
To identify regular-, linen-, and ripple-finish writing papers.
To distinguish rag linen from linen-finish paper.
To purchase paper by the pound or ream.

Leather Goods

The chief leather-goods articles commonly bought, excluding articles of wearing apparel, are trunks, suitcases, and bags. Leather also appears as a factor in upholstered furniture and automobiles. The most common leather used in case- and bag-making is cowhide, though some calfskin, goatskin, and sheepskin, and small amounts of horsehide, pigskin, alligator, seal, and walrus are also used. Upholstery leather is made of cowhide, sheepskin, and goatskin. Cowhides for bag and upholstery leather are generally split into two or more thicknesses. The hair side makes grain leather, which is stronger and sells for a higher price. Often a

[1] United States Bureau of Standards, *Circular No. 70*, page 173.

thin layer is split from the hair side giving a thin grain, and is called buff leather. The flesh side is made into one or more layers and is called split leather. Split leather is embossed to resemble the grain side and is widely used in cheaper goods. Cowhide and sheepskin are often embossed with an artificial grain to resemble fancy leathers, such as seal, walrus, alligator, tortoise, and fish-skin. It is therefore difficult to identify embossed leather because its surface is altered. Sheepskin makes an inferior bag, but it is often embossed with a pigskin grain and is sold as such. Leather bags marked genuine leather or genuine cowhide are often but a thin layer of split leather. Besides the finish produced by the artificial grain there are several common finishes which the consumer should be able to identify. These are: suède, morocco, Cordovan, levant, and enamel.

Thus far the purchasing difficulties are limited to genuine leather, but the greatest ignorance lies in purchasing imitation leather for the real article. The demand for leather is greater than the domestic supply and the price of leather goods is often above the means of the bulk of our population, which is a wage-earning population. Consequently, there is a market for a durable material having a cloth base to be used in the manufacture of bags and upholstery. The problem for the consumer is to avoid being misled as to the nature of the article and its price. The person of limited means should know when it becomes impossible to purchase leather and should then proceed to buy the most durable and attractive coated cloth.

There is a thriving industry of imitation leather goods yielding products to the value of $50,000,000 annually. A leading and apparently reliable concern which sells leather cloth states that nine-tenths of all *leather-covered furniture* is upholstered with leather cloth, that most automobile makers use leather cloth, and that it is extensively used in trunks, cases, and bags. The industry has reproduced the grains of alligator, pigskin, box calf, morocco, and seal with sufficient similarity to deceive the average person. Imitation leather is chiefly a cloth base with one or more coatings of pyroxylin, commonly known as celluloid, upon which

is pressed a leather grain. Some of these leather fabrics are made of paper and rubber. The trade names under which they are sold when the retailer does not wish to mislead are muleskin, pyroxylin leather, leatheroid, fabrikoid, and leatherine.[1]

Objectives Concerning the Use of Leather Goods

To identify cowhide, calfskin, and sheepskin used in bags, cases, and upholstery.
To identify the grain seal, walrus, alligator, and pigskin.
To distinguish grain from split leather.
To know the relative value of cowhide, calfskin, goatskin, sheepskin, horsehide, and pigskin.
To acquire the habit of ascertaining whether a grain is genuine or embossed.
To distinguish or to get aid in distinguishing pigskin from sheepskin with a pigskin grain.
To identify the following leather finishes: suède, morocco, Cordovan, levant, and enamel.
To identify imitation leather.
To know the comparative prices of leather goods and similar imitation leather goods.
To know the common imitation leather trade names, the comparative value of the products which they represent, and their composition.

Floor Coverings

Carpets and rugs are third in importance in the budget of household furnishings as reported in the survey of families. The purchase of carpets and rugs involves a large initial expenditure; therefore special care should be exercised in selecting them. Below is a list of the kinds of carpets produced in this country in 1919.[2] It is important that the consumer should be able to identify these varieties and that he should know a little about their relative merits.

[1] This section is based upon the following sources:
Tariff Information Surveys, *Light Leathers, Group I;* 1922.
Tariff Information Series, *No. 28.*
Raw Material, I, 322; September, 1919.
Lehman, M. A. — *Leather Goods.*

[2] United States Bureau of the Census; *Manufacture of Carpets and Rugs,* 1919; Fourteenth Census of U. S., X, 260.

TABLE LII

RELATIVE COST OF CARPETS AND RUGS IN ORDER OF CHEAPNESS

KIND	FORM	ORDER OF COST
Wool-fiber	whole rug	1
Ingrain	carpet	2
Tapestry, Brussels	whole rug	3
Tapestry, Brussels	carpet	4
Brussels	carpet	5
Tapestry, velvet	rug, sewed strips	6
Axminster	rug, sewed strips	7
Tapestry, velvet	whole rug	8
Tapestry, velvet	carpet	9
Smyrna	whole rug	10
Axminster	carpet	11
Brussels	rug, sewed strips	12
Axminster	whole rug	13
Wilton	carpet	14
Wilton	rug, sewed strips	15
Tapestry, Brussels	rug, sewed strips	16
Wilton	whole rug	17
Cheneille-Axminster	whole rug	18

The cost of Cheneille-Axminster, which is most expensive, is nearly ten times as great as the cost of wool-fiber or ingrain, which are least expensive. Does the above table of difference in cost represent the commensurate difference in actual value? Do these figures reveal any large-scale ignorance of the merits of carpets and rugs? With respect to a commodity like carpets, which consists of so relatively few clear-cut products, it is possible by educational means to modify the habits of the people. In the case of carpets a dearth of investigation has made it impossible to discover evidence that the habits of the people actually are deficient, but this fact does not excuse the school from ascertaining the evidence in order to guide the economic habits of the people.

Rugs made of wool and paper fiber are the least expensive in the textile floor-covering group. In quantity consumed they are very close to the most important of the rugs woven whole. The

report of the United States Tariff Commission,[1] 1921, shows that 10,458,920 square yards of wool-fiber rugs were produced in 1919.

The wool-fiber rug is a very recent product and its extensive use in the last eight years suggests that the great mass of our people, who are low-salaried wage-earners, should know something about the quality of this type of rug. If it adequately meets the tests of home use, it should be more generally adopted. On the other hand, if it proves wasteful, the people of this country should discontinue purchasing it. Besides the wool-fiber rug, an all-fiber rug is made. What are the comparative advantages of the all-fiber and wool-fiber rugs?

Oilcloth and linoleum are common household articles. Comparatively little oilcloth is used as floor covering, but linoleum is very extensively used. The following table shows the common varieties of floor coverings used, the amount used, and the value.

TABLE LIII

FLOOR COVERINGS PRODUCED IN 1919

NAME	QUANTITY (SQUARE YARDS)	VALUE
Floor oilcloth	1,211,000	$424,000
Linoleum and cork carpet	22,098,136	17,120,654
Inlaid linoleum	9,834,332	10,336,391
Floor covering made on felt	30,369,522	13,909,276

The preceding table shows that the number of square yards of oilcloth and linoleum is about 20% greater than that of carpets and rugs. It is reasonable to assume that oilcloth and linoleum are the floor coverings used most widely in the homes of the wage-earning population. It is therefore important that they should be selected with some care. The table shows that linoleum costs about twice as much as felt-back floor covering. Linoleum is very durable and the felt-back floor covering is not. Yet a good deal more of the latter is consumed. Linoleums are sometimes

[1] *American Carpet and Upholstery Journal*, XXXIX, 49, October, 1921.

made of whiting, wood flour, and sawdust, which are inferior to genuine linoleum. The purchaser should learn to guard against these fraudulent products.

Objectives Concerning Floor Coverings

To identify the following kinds of carpets and rugs: Axminster, Wilton, Brussels, velvet tapestry, ingrain, wool and paper rugs, rag rugs.
To know the relative merits of these rugs.
To know the relative cost of these rugs.
To know the three forms in which they come: carpets, rugs made of sewed strips, and rugs woven whole.
To know the relative advantages of these three forms.
To know the merits and defects of wool-fiber rugs.
To know the merits of the all-fiber rugs.
To know the relative advantages and cost of floor oilcloth, linoleum, inlaid linoleum, and floor coverings with a felt back.
To guard against purchasing floor coverings sold as linoleum, but which contain substitutes for the cork and linseed oil which go into genuine linoleum.

Cleansing and Polishing Preparations

The importance of cleansing and polishing supplies as a budgetary item is indicated by the Philadelphia Standard of Living for Workmen, which allots $33.96 to this item in the annual budget, thus ranking it with furniture and health.[1] According to this study, which included 260 families, the chief personal and household cleaning articles purchased were laundry soap, toilet soap, cleanser, tooth paste, shoe polish, furniture and floor polish.

Soap is among the most important of the household articles, being eighth in order of value of goods consumed. From the consumer's viewpoint it is a difficult commodity to purchase because of the complex chemical ingredients of some soaps and also because of the difficulty of detecting adulterants and fillers. There are certain facts, however, which are very helpful to the consumer. Much of our discussion concerning the raw materials

[1] Bureau of Municipal Research of Philadelphia; *Workingmen's Standard of Living in Philadelphia*, 79 and 82.

and finished products will be based upon the 1919 census figures for the soap industry, which follow:

TABLE LIV

THE CHIEF RAW MATERIALS OF THE SOAP INDUSTRY, 1919

FATS AND OILS	
Tallow and grease	406,411,643 lbs.
Coconut oil	24,349,831 gal.
Soya bean oil	7,786,746 "
Cottonseed oil	7,483,987 "
Red oil	3,227,886 "
Palm oil	2,302,463 "
Palm kernel oil	606,807 "
Peanut oil	407,359 "
ALKALIES	
Caustic soda	160,558,000 lbs.
Soda ash	184,438,000 "
Caustic potash	3,086,000 "
FILLERS	
Sodium silicate (water glass)	212,174,000 lbs.
Rosin	119,529,661 "

The test of genuine soap is the presence of fat or oil in proper proportion, which, according to W. H. Simmons, is at least 63%.[1] Therefore, whenever it is possible, the consumer should ascertain the basic material of the soap product purchased. It has been demonstrated by one experiment that the cleansing power of fat and oil in soap is in the following order: tallow soaps; soaps from liquid vegetable oils or olein; coconut and palm kernel oil soaps; and rosin soap.[2] Thus, the cleansing power of soap can be judged if the basic material of the soap is known.

Besides fat and oil the basic elements of soap are alkali and water. There are but two important alkalies used in all soaps. When caustic soda is used, the product is hard soap; when caustic potash is used, the product is soft soap. Hard soap is usually toilet soap, and soft soap is usually laundry soap.

The introductory table shows that a variety of fat and oil is used

[1] SIMMONS, W. H. — *Soap*, 105. Fatty acids is more exact than fat or oil.
[2] Recorded by JACOBSON, LYDIA, in the *Journal of Home Economics*, XIV, 109–113, March, 1922.

in the making of soap. It is of some value to know the relative value of the presence of these materials in soap. In advertising soaps, concerns feature a term directly or indirectly, such as *glycerine*, *palm*, *olive*, etc. It is therefore important to know the real value of the element emphasized in the sale and advertisement of soap.

The War Industries Board [1] gives the chief raw materials of soap manufacture in pounds consumed in 1917.

TABLE LV

CHIEF RAW MATERIALS OF SOAP MANUFACTURE (IN POUNDS)

Tallow and grease	464,000,000
Vegetable oils	293,700,000
Coconut oil	168,000,000
Sodium silicate and rosin	302,000,000
Caustic soda	200,000,000

This table shows that tallow and oil are consumed in about equal amounts in weight. The table also shows that about 25% of the material which is combined with alkali to form soap is filler or substitute for fat or oil.

Palm oil, which we are led to believe is a basic element in a popular American soap, is used only to a small degree in American manufacture. The same is true of olive oil, which is hinted at in the trade name of this same soap. Palm kernel oil, which may be implied in the name here discussed, is used to a limited extent, but makes an inferior soap. Palm oil soap has an orange-yellow to yellow color and is a high-grade soap. Good olive oil yields a white soap; the poorer quality yields a greenish soap. The original Castile soap was made from olive oil.

Coconut oil is used extensively in American soap. It yields a hard white soap which is especially suitable for use in hard water, that is, water containing a high proportion of saline matter. In regions where hard water prevails the consumer should expect a little of coconut oil in his soap in order to get an easy lather and to reduce waste.

[1] War Industries Board, *Price Bulletin No. 49*, page 12.

Cottonseed oil is being increasingly used in the making of soap. It yields a soap which lathers freely but which does not last as long as soap made of tallow.

Oftentimes soaps are produced which contain a large amount of adulterant which in every case is less effective than fat or oil and in some cases does no more than to increase the bulk of the cake of soap. The most widely used substitute for fat and oil in soap is sodium silicate or water glass. More sodium silicate is used than all the vegetable oils combined, and from a half to three-quarters as much as all fat and grease. In December, 1918, sodium silicate was about two cents a pound, while the lowest price for fat or oil was fifteen cents.[1] Water glass renders soap strongly caustic and makes it wasteful in water. Its presence in soap results in a water content larger than that of pure soap.

Rosin is extensively used in soap. When combined with an alkali it produces a compound in many ways like soap made with fat. The price of rosin in December, 1918, was about five cents a pound as compared with the cheapest price of fat or oil, which was fifteen cents a pound. When rosin is used in combination with fats and oils it increases the cleansing value of a soap. When it is used in washing clothes, however, it produces yellow stains. In spite of this fact, figures published by the War Industries Board show that about half of the household soaps used in 1917 contained yellow rosin. The household soaps in 1917 were distributed as follows:[2]

Yellow rosin laundry soaps	1,165,000,000 lbs.
White laundry soaps	466,000,000 "
White floating soaps	699,000,000 "

Borax is sometimes used to increase the cleansing quality of soaps. It is expensive and therefore does not reduce the cost of soap. In any case borax is only a very small part of the total weight of borax soap.

Perfumes are likely to deceive the soap buyer. A good soap made of high-grade tallow and a small proportion of oil has a

[1] United States Tariff Commission, Tariff Information Surveys, *Soaps*.
[2] United States War Industries Board, *Price Bulletin No. 49*, page 11.

sweet, nutty odor, while soap made from poor materials has a less agreeable odor. Poor soap requires strong perfume to neutralize the unpleasant odor or to impart a pleasant odor to it.

A large number of soaps are made which purport to have medicinal properties. The materials which are used in making medicated soaps are phenol or carbolic acid, sulphur, and coal or wood tar. Carbolic soap is a disinfectant, sulphur soap is used in treating skin diseases, and tar soap is a disinfectant. When purchasing medicated soaps it is important to be able to distinguish the several kinds of products.[1]

The cleansing and polishing preparations are very important for the comfort and health of the home, and very often are important factors in the care and preservation of household articles. Often the discovery of a cleansing preparation reduces the amount of home labor considerably. The ingredients of many of these preparations contain chemicals which should be used with care. Many commercial cleaners and polishes are simple solutions sold under a trade name. It is safer, more intelligent, and more economical to make the solution in the home. In spite of this the census reports show that cleaning and polishing preparations are being used increasingly. In 1919 there were 25% more establishments than there were in 1914.

The common household cleaning and polishing operations involve the following articles: walls, ceilings, wood surfaces, floor coverings, windows, mirrors, copper, brass, nickel, earthenware, iron, enameled ware, stoves, floors, and furniture. To facilitate these operations soaps, scouring powder, metal polishes, and grease solvents are used.

The liquid metal polishes are solutions containing one or more of the following ingredients: oxalic acid, muriatic acid, ammonia, benzol, and benzine. The paste polishes contain pulverized mineral material together with whiting, clay, talc, quartz, emery, or silica.

[1] The technical details of this section were obtained from the following books:
Hurst, G. H. — *Soaps;* 1922 edition.
Simmons, W. H. — *Soaps;* 1917.

The common grease solvents are benzol, alcohol, turpentine, benzine, gasoline, chloroform, and carbon tetrachloride. The latter is safest and most satisfactory for household use, and it is often sold under trade names.

The common disinfectants are formaldehyde, carbolic acid, creosote, pine oil, bleaching powder, and bichloride of mercury. Ignorance of chemical names makes it necessary for the consumer to purchase the commercial product.

In addition to the simple substances already mentioned the most common found in cleansers and polishers are borax, sodium carbonate, caustic potash, caustic soda, lye, camphor, and sulphur. These are simple chemical substances which are common ingredients of cleansers and polishes. It is important that every one should be able to identify these substances and know their appropriate uses. If one knows the action of these principal chemical substances, damage and destruction can be frequently avoided. For example, caustic soda dissolves the glaze of glazed earthenware, porcelain, and enamel.[1]

Objectives Concerning the Use of Cleansing and Polishing Preparations

To select a good laundry soap.
To select a good toilet soap.
To know the chief raw materials which enter into soap.
To check up and identify when possible the basic fat or oil in soaps.
To know the relative cleansing quality of the several kinds of soaps.
To distinguish hard and soft soap and to know their appropriate uses.
To know the meaning of the several terms used in connection with soap advertising.
To identify palm oil soap, olive oil soap.
To select an appropriate soap for hard water.
To purchase soap which is not adulterated.
To identify adulterated soap.
To avoid using rosin soap for washing clothes.

[1] NOTE: The technical details concerning cleansing and polishing preparations were obtained from the following sources:
United States Department of Agriculture, *Farmers' Bulletin 1180.*
United States Bureau of Standards, *Circular 70.*
Chemical and Metallurgical Engineering, XXIV, 210, February 2, 1921.
VULTE, H. T. — *Household Chemistry*, 201.

To guard against deception by perfumes.
To identify and select appropriate medicated soap.
To cultivate the habit of using formula books, such as *The Scientific American Cyclopedia of Formulas*, and *Henley's Twentieth Century Book of Formulas, Recipes, and Processes.*
To know the chemicals used in cleansing and polishing preparations and to know the dangers connected with their use.
To ascertain the advantages of newly discovered preparations.
To make the cleansing and polishing preparations, which consist of simple solutions sold under trade names.
To know the appropriate cleansing and polishing preparations to use for walls, ceilings, wood surfaces, floor coverings, windows, mirrors, copper, brass, nickel, earthenware, iron, enameled ware, stove, floors, and furniture.
To know the chief ingredients of metal polishes and paste polishes.
To guard against preparations which injure metals.
To know and identify the common grease solvents: benzol, alcohol, turpentine, benzine, gasoline, chloroform, and carbon tetrachloride.
To know which are inflammable.
To purchase the common disinfectants in the chemical form, as formaldehyde, carbolic acid, creosote, pine oil, bleaching powder, and bichloride of mercury.
To identify some common cleansers and polishes, such as borax, sodium carbonate, caustic potash, caustic soda, lye, camphor, and sulphur.

Adhesive Materials

Adhesive materials in the household play an important rôle in economy. In conversation and in purchasing these materials, glue, mucilage, paste, and cement are often confused. It should be known that glue is chiefly an animal product, that mucilage is chiefly a vegetable product, that paste is chiefly a flour or starch product, and that cement is chiefly a product of the mixture of certain chemical substances. Adhesive materials in the household are commonly used in woodwork, repair of furniture, leather, china, rubber, and paper articles. It is important that one should know the appropriate adhesive substance to be used in connection with these tasks. In many cases the appropriate adhesive prep-

aration consists of simple substances and can be economically and conveniently made in the home. A knowledge of materials and the habit of keeping and using standard formulæ will facilitate home preparation of glues and other adhesives.

In woodworking and in furniture repair glue is one of the most important factors. It is commonly known that glue is improperly handled and wastefully used. The United States Forest Service [1] made tests to ascertain the relative strength of different kinds of glue in woodworking. For the householder these tests indicate that animal glue made from hides and bones is best suited for strong joints, its strength being greater than the strongest woods. For repair work and small articles liquid glue made from animal glue or fish parts should be used. Articles of wood which are exposed to moisture require specially prepared water-resisting glue.

The tests further revealed that the twenty-six commercial glues tested differed widely in strength, some being entirely unsuitable for woodworking purposes. It was found that the strength of glue depends upon its thickness or viscosity. The investigators state that good glue should set and dry rapidly. It should remain fluid and workable in its container at all ordinary temperatures.[2] Foamy glue showed a loss of 25% in adhesive strength.

Objectives Concerning Adhesives

To distinguish glue, mucilage, paste, and cement.
To select appropriate adhesive materials in woodwork, and in the repair of furniture, leather, china, rubber, and paper articles.
To make such adhesives in the home as can be simply prepared.
To know the relative values and appropriate uses of animal glue and liquid glue.
To select specially prepared water-resisting glue for articles of wood which are exposed to moisture.
To identify glue which has great adhesive strength.

Brushes and Brooms

Brushes have an important connection with cleanliness and comfort in the home and ought to receive more attention in selec-

[1] Reported in *Chemical and Metallurgical Engineering*, XXIV, 165, January 26, 1921.
[2] United States Forest Service, Forest Products Laboratory; *Technical Notes No. F–2.*

tion and care. The brush is primarily a domestic article and as such occupies an important place in the budget of smaller household articles. The nation consumes brushes to the value of $40,291,962.

For the household a large variety of brushes are used, including paint brushes, floor brushes, clothing brushes, shoe brushes, tooth brushes, shaving brushes, and others. Special materials are best suited for these uses. Generally speaking, one may use bristles obtained from the hog, other animal hairs, and vegetable fibers. The vegetable fibers are coarser and less durable than the bristles and animal hairs, but are manufactured to resemble bristles very closely. Tampico, a very common brush fiber, resembles bristles very closely.[1] Inspection reveals that animal fibers are more lustrous and smoother than vegetable fibers, but this is not the most reliable test of the difference between the two materials. On burning, the vegetable fiber burns like a splinter of wood and leaves an ash. The bristles and animal hairs when burned shrivel at the end and give off an odor of burning hair.[2]

In the purchase of certain brushes those who seek the best quality should be able to identify bristle and animal hair. A good paint brush should contain no vegetable fiber. A good shaving brush is made of badger hair and should be entirely free from vegetable fiber. Good floor brushes are made of mule hair, but any of the animal hair brushes are more economical in the end than vegetable fiber brushes.[2] For scrubbing and rough uses the vegetable fibers are best because they are more rigid and are not as much affected as animal hairs by boiling water and alkalies.

Concerning the backs of brushes, it is not commonly known that the synthetic materials known as pyroxylin (celluloid) and bakelite are less porous and will not split as readily as bone. Pyroxylin brushes are manufactured to resemble ivory and are sometimes sold as such.

[1] United States Tariff Commission, Tariff Information Surveys; *The Brush Industry*, 27.
[2] Van Deman, Ruth — "Household Brushes"; *Journal of Home Economics*, XIV, 278–281, June, 1922.

The broom, while important in the budget and more universally used for sweeping floors than the brush, is a simple article and offers no great problems to the householder. Practically all brooms are made of broom corn. Common sense dictates several suggestions in the use and care of the broom. It is a simple matter to strengthen the broom by metal bands, wire, old stockings, and the like. A broom which is hung by the handle lasts longer.

Objectives Concerning the Purchase and Use of Brushes and Brooms

To select an appropriate brush for painting, clothing, shoes, teeth, shaving, and scrubbing.
To distinguish vegetable from animal bristles.
To know the relative value of pyroxylin and bone brush backs.
To distinguish pyroxylin from ivory backs in brushes.
To strengthen a broom by metal bands, wire, and old stockings.

Phonographs

There are 6,000,000 phonographs abroad in the homes of the United States. Approximately every fourth home has a phonograph and the rate of increase of the purchase of phonographs as seen in the following table [1] indicates a much wider distribution of phonographs in the future.

Table LVI

PURCHASE OF PHONOGRAPHS BY YEARS

1914	514,000
1916	650,000
1917	900,000
1919	2,226,000

It is obvious that one should have some knowledge to guide him in the purchase and proper use of the phonograph. Although there are more than 150 phonograph manufacturers who produce

[1] Confidential Report, *Operation of Phonograph Departments in Department Stores*, 1; Bureau of Research and Information, National Dry Goods Association.

machines, only a few machines are well known and these are the instruments which are advertised most. The inquiry made by the Bureau of Research and Information of the National Retail Dry Goods Association, from which the data presented here are taken, shows that customers buy advertised products only. They are guided by the paid publicity written for the manufacturer.

In 20 stores in the state of Maryland, 95% of the machines sold were Victors; in 19 stores in Ohio, five-eighths of the phonographs sold were Edisons and three-eighths were Columbias. One can picture the purchasers in a locality holding to a product, undoubtedly well advertised, with almost superstitious tenacity. Thus communities have been kept in prolonged darkness concerning the merits of competing instruments. The most recent machine which has been widely advertised is the Edison machine, which is a departure from the common types in fundamental parts; yet the prospective purchaser has very little background for a comparison or for an accurate understanding of the comparative importance of the sales arguments of dealers whom he many canvass. In New York City, in spite of the variety of machines advertised, it is quite common to hear any type of phonograph called a *victrola*, which is the trade name of one very popular instrument. This is an example of ignorance induced by commercial propaganda and abetted by the neglect of economic education.

It is much wiser to become familiar with the important parts of a phonograph and the qualities which make these parts valuable. Concerning the wood in the phonograph and its quality as an article of furniture, the elements which are worthy of study have been indicated in connection with the discussion of furniture. The machine itself contains three important parts which affect the quality of the music produced by a phonograph. These parts are the motor, the reproducer, and the needle. The motor in a machine of good quality runs smoothly and does not require rewinding too frequently. The diaphragm in the reproducer is the source of the sound in the phonograph, yet few owners trace the defect in a machine to this vital member. Needles are of several varieties; jeweled point, semi-permanent, steel, and wood needles.

The phonograph owner should know the comparative value of these types of needles, there being several varieties of each type.

Concerning the purchase of records, the report referred to above states that there is no appreciable difference between Victor and Columbia records, that the lasting qualities depend upon the needle used, a loud needle being harmful to good records. It should be known that the same needle cannot be used for all records. There are three different kinds of records, depending upon in what part of the groove the vibrations are recorded. In the records made by the Victor and Columbia concerns the cut is in the walls of the groove. In the Edison records the vibrations are recorded on the bottom of the groove, forming little hills and dales. In the Emerson, Pathé, Æolian, Sonora, and Brunswick, the vibrations are on the walls and bottom of the groove. The Edison record cannot be played by any but the diamond-point needle produced by its manufacturer. The Pathé phonograph is also equipped with a permanent needle. The Brunswick reproducer can play all records. The Columbia, Victor, Emerson, Æolian, and Sonora are equipped with steel needles.

Concerning the purchasing plan, the study referred to in this section reports that 67.2% of the phonographs were bought on the deferred-payment plan. Since there is no interest charge by most dealers there is no money loss in purchasing on this plan. The only machines upon which an interest charge is made are the Æolian and Edison.

Objectives Concerning the Phonograph

To know the value of the wood which enters into phonographs.
To identify a good motor.
To know the construction of a reproducer and to select a satisfactory one.
To know the relative merits of jeweled point, semi-permanent, steel, and wood needles.
To select records for their quality of tone.
To know what needle will play a particular type of record.
To purchase an appropriate reproducer for records ordinarily not suited to a particular machine.

To know the sales policies of the phonograph dealers concerning deferred payments.

Automobiles

The discussion of the evidence upon which we shall base our curriculum recommendations concerning the automobile epitomizes the thesis supported in this study. No one will dispute that the automobile occupies a negligible place in our modern elementary curriculum. Curriculum-makers in all probability have made wild guesses as to the extent of the use of the automobile, its economic importance, its relation to the great mass of people. As a result they have allowed their speculations to relegate automobiles to the curricular scrap heap. Possibly the curriculum-makers have not stirred since the last census taking. They are timorously awaiting the next decennial canvass; it is doubtful whether they will take the trouble to make the painful research necessary to discover and interpret existent modes of living as a basis for curriculum change. However, let us proceed with the facts.

The value of the products of the automobile industry, amounting to over three billion dollars, is second only to the meat industry in magnitude. In 1921, there were 10,449,785 passenger cars and motor trucks registered. Mr. Leonard P. Ayres has worked out the following table showing the number of people per car in use each year. It gives the very conservative figure of one car to every twelve persons in 1920.[1]

Table LVII

PEOPLE PER CAR USED IN THE UNITED STATES EACH YEAR

Year	No. of People per Car	Year	No. of People per Car
1912	114	1917	20
1913	78	1918	18
1914	57	1919	15
1915	46	1920	12
1916	30		

[1] Ayres, Leonard P. — *Automobile Industry and Its Future.*

Analyzing these figures further Mr. Ayres concludes that not far from half of the white families in the United States already have cars, which includes a large number who can barely afford to purchase and run their cars. Nearly half of all the motor vehicles in use are Fords. This indicates that the automobile bears a close relation to a great mass of families of medium income. The table showing the expansion of automobile ownership indicates that we may expect a wider use of automobiles since, as Mr. Ayres points out, the point of saturation has not yet been reached.

In certain sections of the United States the introduction of the automobile into the curriculum would be premature, but in the Pacific States, the West North Central States, the Mountain States, and the East North Central States, where the number of people per car is 7, 8, 10, and 10 respectively, it would be stupid to fail to offer some training in the purchase, use, and care of an automobile.

The prospective purchaser of a car is bewildered by considerations of price, names of standard cars, engines, parts, and important accessories. A minimum of information should be acquired by the average person in order to purchase an automobile intelligently. Since about every second automobile purchased is a Ford car, it would be safe in the great majority of our schools to include the essentials of purchasing a Ford car. The prices of 25 standard touring cars range from $415 to $8600. To choose intelligently one must know a little about the relative merits of these cars.

It would be to the point to indicate the consumption of gasoline and tires during the useful life of a Ford car, but in the absence of such figures we must draw our conclusions from those of a more expensive automobile. A $2000 car will use about $500 worth of gasoline during its useful life, and will wear out about $800 worth of tires.[1] The need for care in the use of tires is obvious and the problem comparatively simple. The waste of gasoline in the operation of automobiles is more flagrant and is of great social significance, as has been pointed out in discussing fuels. It was shown that from 20% to 30% of the gasoline used by automobiles is

[1] *The Journal of the Society of Automotive Engineers*, VIII, 3, January, 1920.

wasted. This waste, for the entire country, amounts to about six hundred million gallons of gasoline. Experts have ascribed this waste to defective engines, defective design of the vehicle, and defective gear ratios. These are problems for manufacturer and automotive engineer and their solution will come very slowly.

The means to conserve fuel in the hands of the automobile owner consist first, in avoiding unnecessarily rich mixtures in the operation of all motor vehicles, as at present equipped; and second, in the use of a carburetor and manifold equipment which give the greatest fuel economy. Running on a perfect combustion basis, that is, with a carburetor adjusted to mix 15 parts of air with 1 part of gasoline, the mileage on a Ford car would be a little over 26 miles per gallon. With careful driving and careful adjustment a mileage of 38 miles per gallon has been obtained.[1]

The average length of service of automobiles as used thus far has been a little more than 5 years,[2] giving an approximate annual depreciation of 20%. This figure is an indication of what tremendous possibilities there are in training the great body of automobile owners to keep their cars in good repair.

Objectives Concerning the Automobile

To know how to purchase an automobile.
To know the relative prices of the chief types which are manufactured.
To know the relative merits of the chief types of automobiles.
To select tires according to durability and cost.
To avoid unnecessarily rich mixtures.
To use carburetor and manifold equipment which give greatest fuel economy.
To keep a car in good repair.
To know the important accessories and their special advantages.

[1] *Journal of Industrial and Engineering Chemistry*, XIII, No. 1, page 58.
[2] AYRES, L. P. — *The Automobile Industry and Its Future*, 13.

CHAPTER VI

HOUSEHOLD SKILLS

Introduction

Life in the home demands the ready skill to make things, to repair things, to care for things, and to meet household emergencies. The individual is constantly called upon to design and make contrivances which are not commonly marketed. Frequently it becomes necessary to alter a purchased household article to meet a special need. Household tasks are universal. Wherever there is a home there are numerous jobs to do. The "handy man" in our day is regarded with envious awe. We have developed a body of dependent, helpless, artless individuals who shrink before the simplest mechanical difficulties. The neglect of home construction and repair is due largely to ignorance of the common household skills. Furniture which should be repaired promptly is neglected; simple plumbing difficulties are allowed to do great damage or are corrected at high labor cost; gardens are left idle which should yield a considerable annual revenue; pictures, walls, floor coverings, are ignored when they can be made a source of joy and comfort; much unnecessary labor is expended in wasteful methods of cleaning; the walls, floors, and ceilings of a house are allowed to ruin for want of the simple skills of plastering, cementing, and painting. These neglects are daily causing discomfort and loss.

The person who is mechanically deficient permits damage and decay of household equipment and supplies the usefulness of which could easily be prolonged. Experts are called in to do trivial jobs at mechanics' rates, which the ordinary person skilled in the simple mechanical operations could perform with ease. Sometimes great damage is done and serious loss is incurred, especially in connection with the newer household appliances, be-

cause the untrained individual is not capable of acting immediately upon the discovery of a defect.

It is not proposed here that carpenters, plumbers, painters, and masons should be replaced by amateurs. The household skills to be discussed here are intended first, to make the individual fit to perform the simpler tasks which do not require expert service; second, to do the many repair jobs which are immediate and urgent; third, to perform those special tasks in the home which are not common trade tasks; and fourth, to make such articles as the average home would enjoy having but which it cannot possess because of lack of money or skill. The assumption is that the average home is not kept up to high efficiency because of the general lack of mechanical skill and that the results are discomfort and waste. Some prudent persons learn by observing the trained artisan, but the great body of men and women accept the discomfort and waste which result from ignorance of household skills without ever becoming seriously aware of them.

To those who are quick to defend the workmen against the invasion of the handy man, it is only necessary to demonstrate the very limited income of the mass of the American people as compared with the cost of household labor. It should be remembered that roughly 86% of the population earns less than $2000 per year; that a large part of the population has an income inadequate for buying the daily foods necessary to meet the required standard of nutrition or for paying enough rent to live in a standard home. It is obvious that these families cannot afford to employ skilled workmen whose wages are on the average about 90¢ an hour to do the repair and construction work which arises from time to time.

How Household Skills Were Determined

There is no direct source which enumerates all the skills which persons are called upon to perform in the household. Concerning certain skills, however, the evidence which argues for their inclusion among the body of household skills is quite conclusive. There are the results of surveys of home life which give data con-

cerning some of the more important household operations, and these will be used as a basis for recommending the necessary equipment of the individual to conduct the more important affairs of the home. It is possible, too, to get some notion of the skills required in the household from figures showing the amount and kind of expert labor now hired to perform the repair and construction jobs on a house. The most comprehensive index to the necessary household skills, however, will be the record of materials most commonly consumed, for every material has some skill associated with it.

In determining the household skills which should become curriculum objectives we shall have in mind chiefly the typical American dwelling, which is the detached frame house. Many of the skills recommended apply equally to brick houses and to tenements, but for a complete treatment of the needs of any particular community a special adaptation of a curriculum of fundamentals should be made. For the country as a whole, therefore, it should be remembered that 75% of all the dwellings in the United States are frame, and that 45.6% of the homes are owned by their occupants. When skills apply only to a limited group their importance is limited. It, therefore, is necessary to indicate in connection with each skill the part of the population which is affected.

Household Skills Discovered in Surveys

An illustration of the household skills now performed by families living in a detached frame house is found in J. B. Leeds' study [1] of 60 families. The families are rather above the wage-earning class but not so far above as to be justified in showing such a poor record of performance of household skills as we are about to observe. These figures illustrate quite pointedly the neglect of household work, which is so necessary for economy, comfort, and care in the home. The table also indicates the relative importance of the skills which are performed in keeping the home in order. Among the skills which we should expect to see emphasized are carpentry, painting, upholstering, and plumbing.

[1] Leeds, J. B. — *The Household Budget*, 76 and 80.

TABLE LVIII

RELATIVE IMPORTANCE OF SKILLS IN 60 HOMES

SKILL	FAMILIES IN WHICH IT IS PERFORMED
Carpentry	23.2%
Painting	16.7
Whitewashing	10.0
Papering	5.0
Varnishing	3.3
Staining floors	1.7
Upholstering	1.7
Plumbing	1.7

We have referred several times to the study [1] of 10,000 rural families in typical localities of 33 northern and western states for guidance in describing the economic habits of our people. Concerning household conditions this study gives the following very definite data:

TABLE LIX

HOUSEHOLD CONDITIONS ON 10,000 FARMS

DESCRIPTION	FREQUENCY
Carry water (average 39 ft.)	61%
Do own washing	96
Use power for operating household machinery	22
Use washing machines	57
Use carpet sweeper	47
Use sewing machine	95
Use screened windows and doors	96
Own automobiles	62

According to this study the average working day for women is 13.1 hours in summer and 10.5 hours in winter. Miss F. E. Ward, who reported this study, urges the conservation of woman power by wisely directed investment in modern household improvements

[1] WARD, F. E. — *The Farm Woman's Problem;* United States Department of Agriculture (Department Circular 148).

and apparatus. The farm home needs a modern lighting and heating system, running water, sanitary improvements, and power machinery. What agency do these needs challenge more boldly than the school?

Skills Suggested by Items of Building Construction

In discussing the importance of household materials several significant facts were presented which apply with equal force to household skills. It was pointed out that the cost of labor in the construction of a house was 44% of the entire cost and that the cost of materials was 42.9% of the entire cost. Thus it becomes evident that construction and repair jobs done in the home by a member of the family involve, roughly, a saving of half the cost.

The amount of money spent for maintenance and repair were given in several instances in discussing the housing problem. According to the reports of realtors the cost of maintenance of a $3000 house, for example, is $42 per year. According to the report of another building project [1] the cost of interior repairs alone is $60 per year on a $3000 house. According to the report of a non-commercial housing enterprise [2] the cost of maintenance and repair on a $3000 house would be $120.

The distribution of this cost with reference to frame houses among such items as carpentry, painting, plumbing, glazing, etc., should show exactly what the occupants of homes spend for maintaining their homes. It should show exactly how much could be saved by the occupant if he did repair work himself and should also show the relative importance of the several household handicrafts. Every effort was made to get such figures, but none were available. The National Association of Building Owners and Managers did, however, furnish some figures on a group of apartment houses which showed that decorating was 3.64%; plumbing and steam fitting, 2.55%; carpenter and miscellaneous work, 1.16% of the gross income. These three items comprise 7.35% of the gross income. The conclusion from this discussion of cost

[1] National Housing Association; *Proceedings of Annual Conference;* December, 1920; page 173.

[2] Report of Board of Managers of Cincinnati, Model Homes Co., 1920.

of maintenance and repair is that household skills have a real and definite relation to economic management of the home.

The importance of construction and repair responsibilities in the home should follow roughly the initial distribution of labor among the several occupations in the building of the house. The United States Department of Commerce gives the following figures of the relative distribution of costs among the building workers as tabulated from reports covering the construction of a large number of six-room brick and frame houses.[1] The table indicates that the carpentry skills rank first in importance in the frame house dwelling, the initial cost of carpentry work being very nearly one-half of the total labor cost. Painting, plumbing, and plastering follow, but none is more than one-fifth of the initial cost of carpentry labor.

TABLE LX

DISTRIBUTION OF LABOR COST ON BUILDINGS

KIND OF LABOR	FRAME HOUSE	BRICK HOUSE
Carpenters	49.6%	32.2%
Bricklayers	6.2	21.5
Hod carriers	2.2	6.7
Plasterers	7.9	8.8
Plumbers	8.7	7.6
Electricians	2.6	2.5
Painters	10.0	6.3
Common laborers	6.3	9.9
All others	6.5	4.5

SKILLS SUGGESTED BY THE CHIEF COMMODITIES CONSUMED IN THE HOME

The most reliable and comprehensive guide to the needful skills in the home is the data giving the chief articles consumed in the home in the order of amount spent for these articles. Each of these articles has a body of skills associated with it. Some of the skills are beyond the scope of the average householder. These will not

[1] Taken from a letter written to Mr. Lawrence Veiller of the National Housing Association.

be considered. The mastery of household skills should result in saving money, increasing durability of articles, and increasing health and comfort. These factors will be considered in connection with the skills in order to determine whether they shall be included in the body of curriculum objectives. The extent to which each skill is applicable will be determined by the percentage of the population affected by it and by the extent of consumption of the commodity with which the skill is connected. The initial distribution of labor among the several occupations which has already been pointed out is an additional aid in determining what skills shall be included in our body of curriculum objectives.

Skills in the use of yet other commodities are factors in economy, durability, and health and comfort. These commodities we can set down first in tabular form.

TABLE LXI

HOUSEHOLD COMMODITIES SKILL IN THE USE OF WHICH IS A FACTOR OF ECONOMY

COMMODITY	VALUE OF PRODUCTS CONSUMED (In million dollars)
Plumbing supplies	300.0
Glass	235.0
Paints	232.4
Tools	106.4
Glue, mucilage, and paste	41.5
Sewing machines	31.1
Cleaning and polishing preparations	26.4
Refrigerators	25.8

The table indicates that a comparatively large quantity of plumbing supplies, glass, paint, stoves, and tools are used, requiring a correspondingly large amount of labor in construction and repairs. Glue, washing machines, lamps, sewing machines, cleaning preparations, and refrigerators, too, are factors in economy whose relative importance is partially indicated in the table.

TABLE LXII

HOUSEHOLD COMMODITIES SKILL IN THE USE OF WHICH IS A FACTOR OF DURABILITY

COMMODITY	VALUE OF PRODUCTS CONSUMED (In million dollars)
Lumber and timber products	1,363.6
Furniture	564.1
Plumbing supplies	300.0
Paints	232.4
Brick	188.4
Cement	167.8
Carpets and rugs	123.6
Tools	106.4
Mattresses and spring beds	84.0
Varnishes	80.9
Upholstering materials	39.9

This table indicates that increase in durability, to which the householder should give his attention, is largely related to building materials and furniture, and involves very large money values. Lumber, plumbing supplies, brick, and cement are connected with skills which have to do with the preservation of the most costly single household item: the house. Furniture, upholstery materials, and tools have associated with them skills involving construction and repair of costly household items. Paint and varnish is a very important factor in increasing the durability of both house and furniture.

The conclusions derived, from the following table, concerning the commodities whose skillful use is a factor of health, cleanliness, and comfort are not based upon the relative monetary importance of the commodities. Obviously, the skills connected with the use of cleansing preparations, which are low in the order of monetary value, are of greater importance than the skills connected with the use of carpets and rugs, which are high in the order of monetary value. On the other hand, do we not find an indication of sanitary and safety defects in the comparatively small amount

of money spent by the nation for screens, weather strips, and fire extinguishers?

TABLE LXIII

HOUSEHOLD COMMODITIES SKILL IN THE USE OF WHICH IS A FACTOR OF HEALTH, CLEANLINESS, AND COMFORT

COMMODITY	VALUE OF PRODUCTS CONSUMED (In Million Dollars)
Plumbing supplies	300.0
Soap	295.0
Paints	232.0
Carpets and rugs	123.3
Tools	106.4
Oilcloth and linoleum	64.3
Brushes	40.3
Upholstering materials	40.0
Washing machines	39.6
Lime	33.9
Brooms	29.9
Cleansing and polishing preparations	26.4
Refrigerators	25.8
Screens and weather strips	10.9
Fire extinguishers	5.6

THE COMBINED FACTORS WHICH DETERMINE WHAT SKILLS SHALL BE RECOMMENDED

Thus far we have considered separately some of the factors which should determine the inclusion of household skills in a body of curriculum objectives. The final selection depends upon the composite value of a skill to American home life. We shall therefore consider in turn the following factors: (1) the per cent of families to whom the skill applies, (2) the relative importance of the skill in the original construction of the house, (3) the per cent of families which now perform each skill, as shown in surveys of home life, (4) the materials used in the performance of each skill, (5) the comparative value of the materials in terms of the value of products consumed by the nation, (6) whether several commodi-

Table LXIV

Factors which determine the selection of skills

Skill	Per Cent of Population Affected by It	Initial Cost of Labor, Per Cent	Per Cent Performing Skills in Leeds' Survey	Materials Connected with Skill	Value of Materials in Million Dollars	Are Other Commodities Affected	Does Skill Result		
							in Economy	in Durability	in Health
Carpentry	100	49.6	23.3	Lumber	1363.6	✓	✓	✓	✓
				Furniture	564.1		✓	✓	
				Hardware	142.8				
				Tools	106.4	✓	✓	✓	✓
Painting	100	10.0	16.7	Paint	232.4	✓	✓	✓	✓
Varnishing	100		3.3	Varnish	80.9	✓	✓	✓	✓
Cleaning	100		100.0	Soap	295.8	✓	✓		✓
				Cleansing preparations	26.4	✓	✓	✓	✓
				Carpets and rugs	123.3			✓	✓
				Brushes	40.3	✓		✓	✓
				Brooms	29.9				✓
				Refrigerators	25.8				✓
Plastering and concreting	80	7.9	10.0	Cement	167.8		✓		
				Lime	33.9		✓		✓
Glazing	100			Glass	235.0		✓		
Upholstering	100		1.7	Upholstery materials	39.9	✓	✓	✓	
Plumbing	22	8.7	1.7	Plumbing supplies	300.0		✓	✓	✓
Decorating	100			Paint, pictures		✓	✓		✓
Gardening	66			Tools, seeds		✓	✓		✓
Caring for sewing machines	90			Sewing machines	31.1			✓	
Laying oilcloth and linoleum	100			Oilcloth and linoleum	64.4		✓	✓	✓
Caring for leather goods	100			Leather goods	303.0			✓	
Mending umbrellas				Umbrellas	25.3			✓	
Bricklaying	25	6.2		Bricks	188.4		✓		
Caring for washing machines				Washing machines	39.6	✓			
Caring for mattresses and spring beds				Mattresses and spring beds	84.0			✓	
Using fire extinguishers				Fire extinguishers	5.6	✓	✓		✓
Caring for phonographs	25			Phonographs	156.1			✓	

ties, each of considerable value, are affected by the performance of the skill, (7) whether the ability to perform the skill results in saving money, (8) whether the ability to perform the skill increases the durability of the product, (9) whether the ability to perform the skill improves health, cleanliness, or comfort. These factors have been set down in tabular form and are given below in order to show graphically the relative importance of the several household skills and how they derive their importance.

The table indicates very definitely, on the basis of all the criteria, that there are a few very important bodies of skills which should get greatest attention. These are carpentry, painting and varnishing, cleaning and polishing, and plastering and concreting. It has been possible to correlate the ranks of several of the more important skills. It is significant that there is almost a perfect agreement in rank of carpentry, painting, plastering, plumbing, and bricklaying when arranged (1) in order of cost in original construction, (2) in order of amount of families performing these skills as shown in the Leeds survey of 60 families, (3) and in order of value of products involved in the performance of these skills. The table follows:

TABLE LXV

RANK OF THE CHIEF SKILLS BASED ON THREE FACTORS

SKILL	ORIGINAL LABOR COST	PER CENT PERFORMING SKILLS IN LEEDS SURVEY	ORDER OF VALUE OF PRODUCTS INVOLVED
Carpentry	1	1	1
Painting	2	2	2
Plastering	3	3	4
Plumbing	4	4	3
Bricklaying	5		5

The importance of the cleansing and polishing operations is demonstrated by their universality, the value of the materials involved in the cleaning operations, the value of the commodities affected by these operations, and their great importance in econ-

omy, durability, health, cleanliness, and comfort. Glazing is toward the front in household skills because of the saving it will affect in the homes of our country. Upholstering is important because of its effect on durability and economy. Decorating and gardening are two extremely important items of skill which have great value in increasing the beauty of the home. The money value of gardening will be discussed later. The remaining items of skill which will be discussed in detail are concerned with fundamental home duties.

Carpentry Skills

The carpentry skills will be concerned with construction and repair of articles of furniture and building. It has been shown that half of the labor cost on a frame house goes to the carpenter. The carpenter, therefore, probably leaves behind him half of the sum total of repair tasks to be done in connection with the house. It has been seen, further, that in the Leeds survey of household skills 23.3% of the families reported that they did carpentry work, this being the most frequent skill practiced in the homes studied. It should be remembered, too, that the family invests more money in articles of wood than of any other household material.

Our data show that the development of furniture skills is of special importance. The study of the durability of wood entering into the manufacture of furniture showed that 54% of the wood was not durable. Such furniture will wear out rapidly and will require skill to keep it in repair. The saving resulting from repair and construction work on furniture is illustrated in the estimates of manufacturing costs of furniture made by four factories, reported in *Bulletin No. 2* of the Industrial Bureau of the Merchants Association of New York.[1] The estimates show that the cost of materials in the manufacture of furniture amounts to 20% of the total cost, the remainder being the cost of labor, marketing, and overhead.

The carpentry skills to be recommended will be determined, as already pointed out, by the ease with which they can be performed

[1] Merchants Association of New York, Industrial Bureau, Bulletin No. 2; *The Furniture Industry*, 36; 1919.

and by their relative importance. The carpentry tasks related to maintenance and repair of buildings will include putting on new shingles, the repair of doors, the rehanging of doors, the making of shelves, the putting of screws, nails, and hooks in brick and plaster walls, and the construction of a closet for cleaning materials. There are, to be sure, other important building carpentry jobs, such as repairing of wooden floors, but these are too ambitious for the average person.

The carpentry skills related to furniture are more numerous. First, there is a need to construct simple articles which are not commonly included among the necessaries and whose advantages, therefore, are often neglected. Among the more important of these articles are the coal box, the wood box, the umbrella stand, the blacking box, the plant box, the window board, and window screen. The furniture repair work will consist first of such tasks as apply to most articles of furniture, chiefly to chairs, tables, and bureaus. These tasks include repairing legs, gluing legs, leveling legs, replacing casters, repairing broken joints, gluing broken joints, repairing broken or sticky drawers. Second, there are miscellaneous jobs, such as re-upholstering chairs and couches, repairing window screens, reseating chairs, repairing toys, and repairing roller shades.

Objectives Concerning Carpentry Skills

To hang doors.
To repair swelled doors, to trim a projecting tenon, and to adjust doors which do not close.
To fix a shelf to a brick or plaster wall.
To put on new shingles.
To put hooks, nails, and screws into walls. To find the stud in a wall.
To design and construct a closet for cleaning materials.
To make a coal box, wood box, umbrella stand, blacking box, plant box, window board, and window screen.
To repair broken legs and broken joints in furniture articles.
To glue legs and joints in articles of furniture.
To level legs of chairs and tables.
To replace casters in articles of furniture.

To repair drawers that stick.
To re-upholster chairs and couches.
To repair window screens.
To repair toys.
To reseat chairs.
To adjust an extension table which sticks.
To repair roller shades.
To fit up a work bench.
To acquire the habit of keeping and using a repair equipment.

Skills Related to the Maintenance of a House

The importance of the skills related to the maintenance and repair of a house has been discussed from several viewpoints. It is necessary here only to indicate that the cost of employing skilled workmen is on the average 90¢ per hour; that the mass of our population has an income too low to pay for repairs; that 75% of our population live in frame houses; that 45.6% of the homes are owned by their occupants; that a survey of 60 families showed that too few families now perform the tasks related to the maintenance of a house; that the cost of building materials is about 43% of the total cost of building construction; and that figures giving the cost of maintenance and repair of a house ranged from $42 to $120 per year. It is clear from these data that the skills pertaining to the maintenance of a home are fundamental to efficient and economic home life.

I. PAINTING AND VARNISHING

The first group of skills to be discussed will be painting and varnishing. Painting and varnishing apply to every home. They involve the preservation of wood, metals, and textile fabrics. Henry A. Gardner reports several tests lasting one year, to discover the effect of exposure on wood and metal covered with varnish or paint and on bare wood. The uncoated metal was very rusty while the coated metal was entirely preserved. The painted and varnished wood surfaces were in good condition while the

uncoated wood surfaces were rough, pitted, weather etched, and covered with spots of black fungous growth.[1] Paint is a factor in maintaining a sanitary home and in the lighting of the home. The application of paint is of special importance to the householder because materials make up only 25% of the cost of a painting job. Of the 75% that remains, 50% is the cost of labor, 18% is profit, and 7% is overhead expense.[2]

Paints may be bought ready-mixed or they may be mixed in the home. It was pointed out in discussing painting materials that 40,000,000 gallons of ready-mixed paints were sold in 1917, largely to the household consumer who either does not know how to mix paints or does not wish to take the trouble to do it. These mixed paints often contain large quantities of fillers, substitute pigments, and water. The uncertainty of the quality of ready-mixed paints was illustrated by evidence which showed that of two ready-mixed paints of the same price one contained ingredients to the value of 78¢ while the other contained ingredients to the value of $1.41. It is obvious that it is safer and more economical to mix paints in the home.

The painting skills which the householder should learn to perform include the following: how to prepare the surface of wood, iron, plaster, and brick for painting and for repainting; how to treat nail holes and cracks before painting; how to mix colors to get the desired tint; how to mix and apply the first, second, and third coats properly; how to apply varnish; how to clean paint brushes; and how to care for paint brushes when they are not in use. For special purposes the householder should know how to prepare whitewash and calcimine, to thin paints, and to add a drier.

II. PLASTERING AND CONCRETING

The second group of skills to be discussed will pertain to plastering and concreting. The table of factors which determine

[1] Paint Manufacturers' Association of the United States, Educational Bureau; *Inspection of Tests at Atlantic City* (Circular 79), June, 1920.

[2] VANDERWALKER, F. N. — "Estimates, Costs, and Profits"; *Housepainting and Interior Decorating*, 19.

what skills we shall treat shows that about 8% of the initial cost of labor and building construction is for plastering and that in the study reported by Leeds, 10% of the families performed this household function. The neglect of this skill results in rapid destruction, cold, discomfort, ugliness, and the entry of vermin and insects. The possibilities of concrete construction have been too much neglected in and about the home. The strength, durability, and simplicity of handling the materials, and the variety of useful articles which can be constructed argue for a wider knowledge of the application of concrete.

In the home plaster and concrete work are called for to repair loose plaster; to repair cracks in the walls; to cement cracks in concrete basements, and loose joints in brick, stone, and tile; to seal openings in woodwork and breaks in drain pipes; to repair breaks in concrete walks and steps; to construct walks, floors, steps, driveways, fence posts, and foundations. To make concrete it is necessary to know in what proportions to mix cement, sand, and gravel. In the use of concrete it is necessary to develop skill in the construction of forms into which concrete is poured, and in the use of mixing board, rake, and spade.

III. GLAZING

The third group of skills connected with the upkeep of a house pertain to glazing. Glass is used in every home and is easily broken. The cost of glass should not exceed 40% of the cost of a glazing job. The prompt and thorough repair of broken windows reduces heat loss and increases the comfort and the appearance of the house. The care of window glass involves the following skills: how to cut glass; how to remove old putty; how to make putty; how to use putty; how to put in a new window; and how to repair broken window cords.

IV. PLUMBING

The fourth group of skills to be considered are the plumbing skills. Here we are concerned with a body of skills which do not

apply to a present condition in the majority of the homes of our country but to a condition which will rapidly be introduced and the introduction of which should be hastened by the schools. It is said that 78% of the homes of the country are without plumbing.[1] Plumbing is so definitely related to health that it is fundamental to the homes of the future.

The present condition of water supply and sewage disposal in rural homes is a subject to which rural schools should give careful attention. It is important to know how to install a proper sewage system, to construct and care for a cesspool, and to prevent contamination of water by sewage.

In communities where plumbing is common the following skills, whose performance is within the capacity of the average householder, are most important: how to repair a leaky faucet; how to stop a leak in a pipe; how to repair a leak in a pipe by soldering; how to clean a trap; how to replace a wornout washer in a faucet; how to shut off water in case of a leak; how to prevent freezing of pipes by draining them and by applying heat to them; how to thaw out a frozen pipe; how to improvise a shower bath; how to keep a flush tank in order; how to treat the drainage system intelligently.

Objectives Concerning Skills Necessary in the Care of a House

To mix paints in the home.
To prepare the surface of wood, iron, plaster, and brick for painting and for repainting.
To treat nail holes and cracks before painting.
To mix colors to get the desired tint.
To properly mix and apply the first, second, and third coats of paint.
To apply varnish.
To clean paint brushes.
To care for paint brushes when they are not in use.
To prepare whitewash and calcimine.
To thin paints.
To add driers.

[1] *Crain's Market Data Book and Directory;* 1922, page 345.

To repair loose plaster.
To repair cracks in the wall.
To cement cracks in concrete basements and loose joints in brick, stone, and tile.
To seal openings in woodwork and breaks in drain pipes.
To repair breaks in concrete walks and steps.
To construct walks, floors, steps, driveways, fence posts, and foundations.
To make concrete by mixing cement, sand, and gravel in proper proportion.
To construct forms for concrete work and to use mixing board, rake, and spade in this work.
To cut glass.
To remove old putty.
To make and apply putty.
To put in a new window glass.
To repair broken window cords.
To install a sewage system.
To construct and care for a cesspool.
To prevent contamination of water by sewage.
To repair a leaky faucet.
To stop a leak in a pipe.
To repair a leak in a pipe by soldering.
To clean a trap.
To replace a wornout washer in a faucet.
To shut off water in case of a leak.
To prevent freezing of pipes by draining them or by applying heat.
To thaw out a frozen pipe.
To improvise a shower bath.
To keep a flush tank in order.
To be familiar with the details of a drainage system in a house.

Housecleaning Skills

The housecleaning skills affect practically every article in the home. The serviceability, the durability, the cleanliness, and the comfort of these household articles depend upon what cleaning materials are used and the manner in which they are used. From the social point of view the cleaning skills will determine in a meas-

ure whether the home will attract friends and visitors, whether the family will be respected by its neighbors, whether the children in the home will be favorably influenced in their general habits, and whether the home will be the center of the recreational life of the family.

That the amount of labor expended in this country in cleaning the homes can be reduced and the efficiency increased is argued by many writers. We have seen that the average farm woman works 13.1 hours a day in summer and 10.5 hours a day in winter. The Leeds study of 60 families shows that the total amount of work done by the housewife and her assistants amounts to about $14\frac{1}{2}$ hours per day or $101\frac{1}{2}$ hours per week. Of this sum, $11\frac{1}{4}$ hours per week is devoted to cleaning tasks. The reduction of this burden may not be brought about by the scientific organization of the household functions, as is suggested by some writers; but it can be considerably reduced by the use of efficient equipment.

A complete enumeration of the skills involved in cleaning the home can be made from observation of a typical home. The wood surfaces, metal surfaces, textile surfaces, enamel surfaces, glass surfaces, leather surfaces, painted surfaces, plaster surfaces, stone surfaces, and earthenware surfaces must be treated from time to time. Each of these surfaces must be treated in that way which will produce the best cleaning effect. Specifically, the articles to be cleaned will include walls, ceilings, woodwork, furniture, windows, mirrors, linoleum, matting, carpets, rugs, copper, brass, silver, aluminum, nickel, iron, steel, earthenware, enameled ware, china, stoves, floors, upholstery, refrigerators, cupboards, gas ranges, and beds.

The miscellaneous cleaning tasks which one is commonly called on to perform in the home are to remove paint from woodwork and enamel; to apply disinfectants and antiseptics to exterminate ants, bedbugs, cockroaches, flies, rats, and mice; to dispose of garbage and ashes; and to keep brooms, brushes, mops, carpet sweepers, and other cleaning tools in good condition when not in use.

Objectives Concerning Cleaning Skills in the Home

To clean the following with minimum labor and maximum results: walls, ceilings, woodwork, furniture, windows, floors, carpets, rugs, linoleum, matting, mirrors, refrigerators, cupboards, gas ranges, beds, copper, brass, silver, aluminum, nickel, earthenware, enamel ware, china, stoves, waxed wood, varnished wood, oiled wood, painted wood, burlap walls.

To remove paint from woodwork and enamel.

To use disinfectants and antiseptics.

To exterminate ants, bedbugs, cockroaches, flies, rats, and mice.

To dispose of waste, garbage, and ashes.

To use and to keep properly the following cleaning tools: brooms, brushes, mops, vacuum cleaner, carpet sweeper, oil mop, mop wringer, and polishing cloth.

Decorative Skills

Here we are dealing with skills the value of which it is difficult to demonstrate. We must preface our recommendations with the categorical statement that beauty increases the joy and the comfort of home life. Beauty is not determined by the amount of money expended for decoration. Indeed, the economic situation of the people of our country, the improvement of which can only come gradually, forces the attention to such sources of pleasure as are present in the immaterial values of home life. One of these is beauty.

Color and plant growth can give a magic touch of charm to a drab exterior. Trees, shrubs, vines, and plants make a pleasing setting for the home. The artistic application of color to the interior of a home makes it pleasant and congenial for living and for leisure. The proper use of light creates beauty and warmth. Colors may be used to harmonize with the purpose of rooms or household articles. The choice of pictures and the method of hanging them will affect the appearance of a room. Stencils may be used in the decoration of walls, furniture, flower boxes, curtains, and woodwork.

Objectives Concerning Decorative Skills

To use color, trees, shrubs, vines, and plants for exterior decoration.
To select appropriate color for the kitchen, dining room, and children's room.
To use color to beautify furniture, flower boxes, curtains, and woodwork.
To use stencils in decorating the home.
To select and hang pictures and picture frames which increase the beauty of a home.
To use color to create the psychological effects of distance, nearness, warmth, and gayety.
To select appropriate wall paper.

Gardening Skills

What evidence is there that it is desirable to teach the gardening skills in the schools? That the great mass of families of our country have a little patch of land to cultivate is evident from the data which show that about 75% of the homes in the United States are frame houses, and that approximately 10% more are single-family brick houses with a little land attached to them. In the rural school much practical gardening has been introduced into the school program; where it has not been introduced there should be no forgiveness for this neglect. In the town and city schools the teaching of gardening should depend upon the local demand. In six districts of Providence, where the detached frame house predominates, 296 out of 644 homes — 46% — kept gardens.[1] The study in this community showed that where gardens were grown there was no litter. Providence is typical of a great many large cities, such as Philadelphia, Baltimore, and St. Louis, in which one-family houses predominate. Of all the buildings erected in cities having a population over 35,000, a little over 67% were one-family houses. These houses undoubtedly were provided with an exclusive piece of land for gardening. It is evident that even in cities there is good ground for teaching gardening in the schools.

The Massachusetts Homestead Commission,[2] it will be remem-

[1] Ihlder, John — *The Houses of Providence*, 28, 1916.
[2] Massachusetts Homestead Commission; *Fourth Annual Report*, 32–35, 1916.

bered, initiated the only governmental housing project. In planning the house the Commission considered the financial value as well as certain immaterial values of a garden. Dividing an acre among eight families, the layout gave each family approximately a lot having a frontage of 40 feet and a depth of 110 feet. The subdivision of such a lot would give a front yard of 10 feet of the depth of the lot; house space of 40 feet, allowing for outdoor work, play, clothes drying, and flowers; a garden of 50 feet, or 2000 square feet; and a poultry yard of 10 feet. The Commission gives the record of the actual expenses of gardening on a plot of 2000 square feet. The figures show a net return of $22.50 from gardening, which the Commission considers low. The Commission puts the return on the garden at $25 and on poultry at $11, giving the sum of $36 per year or $3 per month, which, it is suggested, can help to pay off the loan on a house.

The elements of good gardening include the selection of good seed, proper preparation of soil, proper planting, thorough tillage, and an acquaintance with the nature and habits of the plants which are grown. The gardener should know the quantity and kind of seeds to be bought. He should know when to plant and in the case of early vegetables he should know how to plant in a seed box. In connection with garden work the householder should know how to manipulate a spade or garden fork, a hoe, a steel-tooth rake, a trowel, a watering can or hose, a line, stakes, and a hand cultivator. The garden worker should know how to use a gardener's planting table.

Objectives Concerning Gardening Skills

To purchase proper seed in proper amounts.
To prepare the soil for planting.
To plant the seed.
To cultivate the soil.
To weed a garden.
To know the nature and habits of the plants commonly grown.
To water a garden.
To apply fertilizer.

To start early vegetables in a seed box.
To use a gardener's planting table.
To use the following tools efficiently: spade or garden fork, hoe, steel-tooth rake, trowel, watering can or hose, line, stakes, and hand cultivator.

Miscellaneous Skills

Among the skills connected with the use of hardware and metal products the most common are: repairing a door knob; putting on a new hinge; sharpening knives, scissors, and tools; cleaning a clock; mending the frame of an umbrella; repairing simple locks; repairing household utensils by soldering. The soldering skills include the use of the soldering copper or torch, solder, and flux. It is necessary to know when to use soft solder and when to use hard solder.

In connection with the use of leather it should be known that leather bags, trunks, belts, and upholstery can be kept from drying out by rubbing vaseline into them. One should know how to mend torn leather and how to use leather from discarded articles. Articles made of china break easily; therefore every householder should know how to mend china. Valuable glass products may be mended with specially prepared glue. Rubber is coming into the home more, and how to use rubber adhesive should be known when the necessity arises. Since phonographs are becoming so common it is important that the user should know how to keep a reproducer and motor in good order.

It was previously indicated that overcrowding in American homes is quite common, the figures in some cases being very high. The ultimate objective, of course, is to eliminate overcrowding; but since this is dependent upon social and economic conditions which it will take a long time to change, it is wise to teach the present generation to construct appliances which will increase comfort and insure privacy. A single double-decker folding bed is more comfortable and wholesome than one bed for two. The construction of a window shield reduces the draught but allows

the air to come in. The construction of screens or the hanging of heavy portières will give more privacy to the sleeping rooms. The construction of a collapsible table or a table hanging on hinges against the wall will increase the usable space in a room.

Objectives Concerning Miscellaneous Skills

To repair a door knob.
To put on a hinge.
To repair household utensils by soldering.
To sharpen knives, scissors, and tools.
To clean a clock.
To mend the frame of an umbrella.
To repair simple locks.
To grease bags with vaseline to prevent them from drying out.
To mend torn leather.
To use discarded leather articles.
To repair broken china and glass.
To mend rubber articles.
To keep a reproducer and motor in good order.
To construct double-decker beds, hanging beds, and the like when there is overcrowding in the home.
To make a window shield.
To make screens or portières for privacy in a sleeping room.
To construct a collapsible or hanging table to increase room space.

Guarding against Hazards

Elsewhere the prevention of accidents arising from the use of fuels was discussed. It is necessary here to indicate those common household articles whose chemical nature renders them dangerous. Painting materials contain salts of lead and mercury, which are poisons when introduced into the system or when in contact with the skin for some time. Some shellacs and varnishes contain methyl alcohol, which has a paralyzing effect upon the optic nerve. Oxalic acid used in some kinds of shoe polish, in metal polish, and in cleaning straw hats is poisonous and corrosive. Caustic alkalis used in removing paint or varnish and

in soap-making are irritating to the mucous membranes. Concentrated ammonia also irritates the sensitive membranes. Corrosive sublimate and carbolic acid, which are used for antiseptic purposes, are perhaps the most common fatal hazards in the household.[1]

Objectives Concerning Safety in the Use of Household Materials

To avoid contact with the salts of lead and mercury in the use of paint.
To guard against the effect of methyl alcohol on the eyes in the use of shellac and varnish.
To guard against the poisonous and corrosive effect of oxalic acid in the use of shoe polish, metal polish, straw hat cleaning fluid.
To guard against the effect of caustic alkalis on the sensitive membranes.
To avoid irritation of the sensitive membranes in the use of concentrated ammonia.
To guard against the poisonous effects of corrosive sublimate and carbolic acid present in antiseptics.

Measurement and Calculation Connected with the Purchase and Use of Household Articles

The purchase and use of household articles involve certain measurements and calculations which are fundamental to efficiency in the home. What these measurements are will be ascertained by a study of the measurements commonly connected with housing, household materials, and household skills.

For initial suggestion concerning the numerical operations connected with the purchase and use of household materials we turn again to G. M. Wilson's [2] study of the social uses of arithmetic. It will be remembered that his results are based upon a study of the actual numerical operations of 4068 persons of varying occupations and locations. The following table gives the arithmetical problems relating to household materials and their frequency of occurrence in the study. The household topics com-

[1] United States Bureau of Standards; *Circular 75*, page 114.
[2] Wilson, G. M. — *A Survey of the Social and Business Usage of Arithmetic*, 29.

bined comprise 8.07% of all the topics treated by the families studied.

To ascertain whether the persons studied by Wilson were performing calculations which were of greatest importance to the maintenance of the home, the arithmetical topics were ranked in order of importance with respect to present use, value of the product connected with the topic, and importance of the skill connected with the topic. This ranking does not permit a complete comparison because the topics as classified according to the three factors do not always agree. A few main facts, however, are evident. Lumber, which ranks at the top in frequency of skills connected with its use and in quantity consumed, occurs only half as often in the calculations of the persons studied by Wilson as hardware. Numerical operations involving real estate and rent rank high, as they should. Calculations involving paint rank in the middle, which fact indicates that perhaps paint is not sufficiently used in the home, that it is not mixed in the home, and that ready-mixed paints are not tested or checked up.

TABLE LXVI

ARITHMETIC OF HOUSEHOLD MATERIALS USED BY 4068 PERSONS AS COMPARED WITH THE RELATIVE IMPORTANCE OF THESE MATERIALS

	RANK: QUANTITY OF PRODUCT USED	RANK: VALUE OF PRODUCT CONSUMED	RANK: IMPORTANCE OF SKILLS CONNECTED WITH PRODUCT
Hardware	1	10	1
Paper	2		19
Real estate	3		2
Rent	4		2
Lumber	5	2	1
Household furnishings	6		
Autos and supplies	7	1	20
Hides and leather	8	4	13
Implements and machinery	9		
Furniture	10	3	1
Paint	11	7	2
Taxes	12		

TABLE LXVI — *Continued*

	RANK: QUANTITY OF PRODUCT USED	RANK: VALUE OF PRODUCT CONSUMED	RANK: IMPORTANCE OF SKILLS CONNECTED WITH PRODUCT
Stationery	13		19
Cement	14	9	2
Tile and brick	15	8	5
Glassware	16	6	21
Construction	17		1
Repairs	18		1
Board and lodging	19		2
Soap	20	5	4
Rugs	21	11	12
Boxes	22		

The next problem is to determine what processes are involved in calculations connected with the purchase and use of household materials. The following table lists the skills and commodities used in the household. Each skill and commodity has a unit of measure connected with it which is also listed. Additional columns indicate whether fractions, interest, decimals, percentage, and accounts are connected with each item. This table, therefore, is an outline of the numerical calculations which concern us here.

TABLE LXVII

CALCULATIONS INVOLVED IN THE PURCHASE AND USE OF HOUSEHOLD MATERIALS

SKILL	MATERIAL	UNITS	FRACTIONS	INTEREST, DECIMALS, AND PERCENTAGE	ACCOUNTS
Carpentry	Lumber	Linear			
	Furniture	Linear	$\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$, $\frac{1}{16}$	*	*
	Hardware	Dozen, pound	$\frac{1}{2}$, $\frac{1}{4}$		
	Tools				

TABLE LXVII — *Continued*

SKILL	MATERIAL	UNITS	FRACTIONS	INTEREST, DECIMALS, AND PERCENTAGE	ACCOUNTS
Painting	Paint	Liquid, pound	$\frac{1}{2}$, $\frac{1}{4}$	*	
Varnishing	Varnish	Liquid	$\frac{1}{2}$		
Cleaning	Soap	Pound			
	Cleaning preparations	Liquid, pound	$\frac{1}{2}$		
	Carpets and rugs	Linear	$\frac{1}{2}$		
	Brushes				
	Brooms				
	Refrigerators (ice)	Pound			
Plastering and concreting	Cement	Barrel			
Glazing	Glass, putty	Linear, pound	$\frac{1}{2}$, $\frac{1}{4}$		
Upholstering	Upholstery material	Linear	$\frac{1}{2}$, $\frac{1}{4}$		
Plumbing	Plumbing supplies	Volume			
Decoration	Paint, pictures	Linear, circular	$\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$		
Gardening	Tools, seed	Linear	$\frac{1}{2}$	*	*
Care of sewing machines	Sewing machines				
Laying linoleum	Oilcloth, linoleum	Linear, square	$\frac{1}{2}$, $\frac{1}{4}$		
Care of leather goods	Leather goods				
Mending umbrellas	Umbrellas				
Bricklaying	Bricks				
Care of washing machines	Washing machine				
Care of mattresses	Mattresses				
Telephones					*
Use of fire extinguisher	Fire extinguisher				
Water	Water meter	Volume			
Care of phonograph	Phonograph				*
Taxes				*	
Rent and real estate	House and land	Linear, time		*	*
Ventilation	Thermometer	Degrees		*	
Auto (care and use)	Auto	Liquid		*	*
Paper		Ream, quire			

The following table is a summary of the frequency with which each unit occurs in the list of household articles and skills. Another column shows the number of processes connected with each unit which involve the use of fractions. Money is not listed among the units because it is evident that it enters into every purchasing transaction and therefore is indispensable. The fundamental operations are not discussed but, as has appeared in discussions elsewhere, calculation is impossible without them. Linear measure is of first importance, the foot being the unit most frequently employed. The measures of weight and liquids are next in order of importance, the most common units used being the pound and the pint.

TABLE LXVIII

RELATIVE IMPORTANCE OF UNITS USED IN HOUSEHOLD CALCULATION

MEASURE	FREQUENCY	USE OF FRACTIONS
Linear (foot)	8	7
Weight (pound)	6	4
Liquid (pint)	4	3
Volume (cubic yard)	2	
Dozen	1	1
Time (day)	1	
Barrel	1	
Square	1	
Temperature (degree)	1	
Circular	1	
Paper (quire)	1	
TOTAL	27	15

The following table is a summary of some of the measuring units employed in the calculations of 14,583 home problems studied by Wilson. This table is not comparable with the preceding table because the former applies to operations involving household articles while the latter applies to all arithmetical operations in the home. A few facts, however, stand out. The first conclusion is that, in comparison with the total number of problems, those involving the measuring units are negligible.

There is either a lack of knowledge of the measuring units or a disinclination to use them. The linear measures, which enter so extensively into the purchase and use of furniture, carpets and rugs, lumber, glass, upholstery, linoleum, and land, occur in 52 problems out of a total of 14,583. The weighing unit, which is used in the purchase and use of hardware, pigment, soap, and cleaning preparations, occurs in 35 problems out of 14,583. The use of fractions occurs in 130 problems, while our table shows that fractions are commonly used in relation to at least 15 household articles. In connection with the use of linear and avoirdupois measures, which are most frequently used, the fractions appear on the measuring instruments themselves.

TABLE LXIX

SOME ARITHMETICAL PROCESSES EMPLOYED BY 4068 PERSONS WITH SPECIAL REFERENCE TO UNITS OF HOUSEHOLD ARTICLES

MEASURE	FREQUENCY
Square measure	124
Time	111
Liquid	96
Cubic	78
Linear	52
Avoirdupois	35
Circular	25
Fractions	130

We are now ready to consider the specific demands in the home for the use of arithmetic. Construction and repair work include the use of lumber, furniture, hardware, and tools. Linear measure is chiefly used, and since the measurements are made with a rule the fractions $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$, and $\frac{1}{16}$ will appear commonly. The board foot, which is 1 foot square by 1 inch thick, is used in measuring lumber. Molding is sold by the running foot, and shingles are sold by the thousand.

When paint is bought ready-mixed it is sold by liquid measure. When paint is mixed in the home, linseed oil is bought by the

quart or gallon, and pigment by the pound. Fractions will appear in connection with the liquid and avoirdupois measures. Varnish is bought in a can in liquid units and fractions thereof. The cleansing and polishing preparations are bought both by liquid and avoirdupois measures. Cement is sold by the barrel. The capacity of lime barrels is fixed by Congress at 180 and 280 pounds. Glass buying involves linear measure and putty is bought or made, the unit involved being the pound. Upholstery materials are bought by the yard. In plumbing work, cubic measure enters in connection with sewage-disposal jobs.

The decorative skills involve the use of linear measure, and design requires circular measure. Gardening requires measurement of length in planning rows and measures of weight and volume in disposing of the crop. The use of floor coverings involves the measurement of lengths with a rule or measuring tape and sometimes requires drawing diagrams to assist in laying linoleum or carpet properly. The water meter registers cubic feet. The thermometer requires the use of the unit of temperature — the degree. Paper is bought by the quire or ream.

The keeping of accounts applies to several items which we are now considering. Certain articles in the home, especially autos, furniture, and phonographs, are frequently bought on a part-payment plan. It is necessary in such cases to keep an account or to check up the company's account. In connection with the ownership of a home, real estate, and other properties, there are items of expenses and receipts which should be kept systematically. A check book is a book of accounts which must be kept carefully. The telephone bill can be checked back by keeping an account of calls. The cost of maintaining an auto and garden can be ascertained only by keeping a careful account.

Percentage, decimals, and interest appear in diverse connections. Taxes are calculated on a decimal basis. Certain formulæ involving paint and chemical preparations are sometimes given in decimal or percentile form. To check back the relative expenditure for rent and household materials it is necessary to convert

these items into percentile values. When one's rent is increased it is important to ascertain the magnitude of the increase by converting it into terms of per cent. For example, a present law in New York State requires that an increase in rent of over 25% need not be paid without litigation. When there is a shortage in the delivery of materials purchased it very often helps to determine how important the shortage is by converting it into terms of per cent. The part-payment scheme involved in the purchase of furniture, autos, and phonographs requires that the purchaser shall know how much of the bill is interest. The property owner must use decimal calculations in connection with the payment on real estate, mortgage loans, notes, etc.

Rent has been discussed fully elsewhere. It was indicated that public documents give the assessed value of every house and lot. It is possible to determine what per cent rent is of the assessed value of the property. Thus exorbitant rent can be discovered and properly handled. In apartment houses the total rent on a house can be calculated by multiplying the total number of rooms by the rent per room. When a tax increase affects rent the tenant should determine how much of the burden he should bear. Home ownership involves the payment of taxes, interest, bills, the interpretation of estimates of repair and construction, of mortgage plans and amortization plans.

The following household articles are sold in containers: washing powders, cleaning and polishing preparations, soap, ink, paste, glue, paint, varnish, tacks, screws, brads, picture wire, writing paper, oils, cement, and lime. It is necessary on occasions to check up the net content of the container. When one wishes to compare the relative cost of an article which is sold by concerns in containers of different measures it is necessary to make calculations of quantity and cost.

The measuring instruments used in the purchase and use of household articles are: the rule or measuring tape, weighing scale, quart, pint, half-pint, four-ounce graduate, clock, and thermometer. Every person should learn how to use these instruments accurately and skillfully.

Objectives Concerned with Household Measurement and Calculation

To use the board foot in measuring lumber.
To use a carpenter's rule.
To use the liquid measure in measuring paint, varnish, cleansing preparations, and gasoline.
To use avoirdupois measure in connection with hardware, pigment, cleaning preparations, ice, putty, and paper.
To use the measure of a barrel in connection with lime and cement.
To use linear measure in measuring land, lumber, furniture, carpets and rugs, glass, upholstery, and linoleum.
To use cubic measure in connection with sewage problems.
To use the dozen in connection with the purchase of hardware.
To use circular measure in decorative tasks.
To use: the inch, foot, yard; ounce, pound; pint, quart, gallon; second, minute, hour, day, month; barrel; degree; quire, and ream, in calculations connected with the purchase and use of household materials.
To keep accounts of the cost of autos, furniture, and phonographs bought on a part-payment plan; of the cost of maintenance of a house; of checks paid out; of telephone calls; of maintaining an auto; and of maintaining a garden.
To use decimals, percentage, and interest in calculations involving: formulæ for paint and cleansing preparations; the relative expenditure for household articles and rent in the budget; the per cent increase of rent; the per cent shortage in delivery; interest on loans, notes, and real estate; interest on long-time payments for furniture, autos, and phonographs.
To make calculations in determining a fair rental.
To calculate the effect of an increase of taxes upon rent.
To calculate one's tax bill.
To read estimates of construction and repair.
To understand mortgage plans and amortization plans.
To check up the contents of a container.
To compare the cost of articles put up in containers by two or more concerns.
To use the following measuring instruments skillfully: rule, measuring tape, liquid measures, graduate, clock, and thermometer.
To use calculations in connection with the construction and repair of furniture, buildings, concrete articles, upholstery, and plumbing.

To make and use a working drawing.

To use fractions in calculations involving lumber, furniture, hardware, paint, varnish, cleaning preparations, carpets and rugs, glass, upholstery materials, gardening, and linoleum.

To use money in calculations involving household articles and rent.

CHAPTER VII

FUEL CONSUMPTION

Introduction

We are concerned in this section with the habits of our nation in consuming fuel in the home. We shall determine what fuels are actually used by our nation; ascertain the enormous waste in their use; discover the comparative values of fuels and fuel equipment; and finally indicate the objectives of training for effective consumption of fuels.

The common fuels for domestic purposes are coal, wood, gas, kerosene, and electricity. The extent to which these fuels are used in the home will be ascertained by studying government and trade statistics and several surveys. These will be discussed in turn and their implications as regards educational procedure will be noted.

The use of fuel in cooking was discussed in a fragmentary way in connection with food skills. The facts brought out then were that there are over 2,400,000 domestic natural gas consumers, and that they waste more than 80% of the natural gas received. Waste of gas is due to faulty pipes, fixtures, and appliances, and unnecessary burning. The efficiency of the coal range is very low. Wood can be used economically when the supply is abundant. Electricity as a cooking fuel is uneconomical except where an abundant water supply makes it exceptionally cheap.

The Chief Household Fuels

The United States Geological Survey, in a mimeographed report dated July 23, 1921, states that 640,950,000 tons of coal were consumed in 1917. Of this amount about 103,000,000 tons of coal were used by domestic consumers, which, divided by the

number of homes in the United States in 1920 (a figure not much in excess of that of 1917, due to the cessation of building activity during the war) indicates that the average household in the United States consumes 4.2 tons of coal per year. Of the coal consumed in 1917 for domestic use 57,100,000 tons were bituminous and 49,400,000 anthracite. The homes consume 10.3% of all the bituminous coal used and 55.1% of all the anthracite coal used in the United States. The eastern states depend largely upon anthracite coal for domestic consumption and the rest of the country uses bituminous coal chiefly.

The total consumption of gas in the United States in 1919 was 916,000,000,000 cubic feet. Of this, 660,000,000,000 cubic feet was natural gas and 256,000,000,000 cubic feet was manufactured gas.[1] One-third of the natural gas used was consumed in 2,400,000 homes in the United States, and probably a similar proportion of manufactured gas. Nearly 38% of all the natural gas is consumed by the states of Virginia and Pennsylvania.

One-third of the timber cut in the United States, 75,000,000 cords, is used as fuel.[2] Most of this is used on farms. The *United States Statistical Abstract* for 1920[3] gives the following table showing the use of firewood on farms.

TABLE LXX

FIREWOOD USED ON FARMS

Number of farms	6,452,000
Cords per farm	10.6
Total cords	68,244,000
Value per cord	$5.07
Total value	$345,866,000

The extent of consumption of wood as fuel in small cities is indicated in a report for 1908. In that year more than five times as much firewood was used on farms in the United States as in cities under 30,000 population. The figures follow:[4]

[1] *Chemical and Metallurgical Engineering*, XXIII, 695, October 6, 1920.
[2] OWEN, ERNEST — *Chemical Age*, XXIX, 284–9, July, 1921.
[3] Page 563.
[4] United States Department of Agriculture; *Forest Service Circular No. 181*, 1910.

TABLE LXXI

FIREWOOD USED IN THE UNITED STATES IN 1908

On farms	69,961,066 cords
In cities under 30,000 population	12,611,033 cords
In cities over 30,000 population	1,613,594 cords

The importance of electricity in the curriculum of the school may be discovered from observing the extent to which it touches the average citizen of our nation. In 1917, according to the census bureau, there were 7,178,703 customers who received electric current. It has not been possible to ascertain what per cent of these were domestic consumers.

To the westerner, electricity is of special importance. The per capita production of electric power in 1920 for the eleven western states was 895 kilowatt hours, while for the whole United States it was 416 kilowatt hours. The westerner uses more than two times as much electricity as the easterner. The west depends largely upon hydraulic energy for generating electricity. The 11 western states generated almost 40% of the entire hydro-electric power in the United States. California, with a population approximately 3% of that of the United States, has more than 10% of the total electricity consumers in the United States. Several western power companies, which served 593,740 consumers, in 1920 reported that in the territory which they served 83% of the homes were electrified, as compared with 75% in 1910.[1] The cost of electric power in the western states is lower than that in any other region of the United States.

Kerosene is used generally in rural districts and to a considerable extent in cities. The per capita consumption of kerosene for states east of the Rocky Mountains in 1918 was about 14 gallons.[2] The total consumption of kerosene in the United States in 1920 amounted to 1,398,223,970 gallons. Two-thirds of this was consumed in homes for illumination and heat.[3]

[1] *Journal of Electricity and Western Industry*, June 15, 1921.
[2] *National Petroleum News*, XI, 14, January 1, 1919.
[3] POGUE, J. E. — *The Economics of Petroleum*, 140.

Comparative Importance of the Chief Fuels

We have seen that the chief fuels used by our nation are coal, gas, wood, electricity, and kerosene. The real measure of comparative importance of these fuels is their caloric value. The quantities of each fuel, therefore, were converted into British Thermal Units (B.T.U.), one B.T.U. being the amount of heat required to raise one pound of water one degree Fahrenheit. For this purpose we used a table quoted by A. H. Barker.[1] The heat value for natural and artificial gas was taken from Poole's *Calorific Power of Fuels*, 1918 edition. The values used were:

Coal, per pound	14,000 B.T.U.
Natural gas, per cubic foot	19,440 "
Artificial gas, per cubic foot	3,642 "
Electricity, per kilowatt hour	3,410 "
Kerosene, per pound	18,000 "
1 ton of coal	= 1½ cords of wood
1 gallon of oil	= 8.5 lbs.

Having reduced the fuels of the nation to heat units we find that coal and gas supply the large part of the heat energy of the nation. When we consider domestic consumption of fuels exclusively we find that gas furnishes more fuel energy than coal, and that wood becomes a very important factor.

Table LXXII

RELATIVE CONSUMPTION OF FUELS IN 1920 IN ENERGY VALUE

Fuel	Consumed by Industries and Homes		Consumed in Homes Only	
	Quantity	Billion B.T.U.'s	Quantity	Billion B.T.U.'s
Coal [2] . .	640,950,000 tons	17,934,000	103,000,000 tons	2,800,000
Gas [2] . . .	916 billion cu. ft.	13,799,772	305 billion cu. ft.	4,566,391
Electricity .	43,940 million k.w.h.	149,385		
Kerosene .	1,398 million gal.	214,200	932 million gal.	142,800
Wood . .	75 million cords	1,400,000	67 million cords	1,260,000

[1] Barker, A. H. — *Domestic Fuel Consumption*, 18, 1920.

[2] Since coal and gas are used in generating electricity, these items are duplicated to a small degree in the energy value of electricity. The proper accounting could not be made since the amount so used was not ascertainable.

The Fuels of Our Nation as Shown in Surveys

The relative importance of the several fuels used in the home is suggested in the data collected in various surveys. The Philadelphia survey, made in 1918, covering 260 families, shows that 99% of these families used coal, 99% used gas, 45% used kerosene, 33% used wood, and 1% used electricity. The expenditures per family for these fuels were: coal, $35.11; wood, $2.76; gas, $24.48; electricity, $17; kerosene, $4.62.

In connection with a study of 1000 families in Columbus, Ohio, R. D. McKenzie states that for lighting, 79.4% of the families studied used gas, 9.2% used electricity, and 9.9% used oil lamps.

The survey of 10,000 representative rural homes in 33 states reported by Florence Ward shows that each home had an average of 1.29 stoves (burning wood undoubtedly), and that 79% of the families used kerosene.

In connection with a study of cost of living in 92 cities made by the United States Bureau of Labor Statistics figures were collected giving the cost of the various fuels used by the families studied for heat and light.[1] The relative consumption of these fuels based upon cost is given in the following table.

Table LXXIII

Relative consumption of fuels in 92 cities

Bituminous coal	100
Gas	94
Anthracite coal	77
Wood	44
Electricity	40

Again it is shown that the fuels which a curriculum for American schools must take into account are coal, gas, wood, electricity, and kerosene. It is clear that in some localities certain fuels are not used at all. What fuel knowledge is necessary to a more economic and effective use of fuels in any particular community should be ascertained and included in the curriculum of the local schools.

[1] United States Bureau of Labor Statistics; *Monthly Labor Review*, September, 1920, page 92.

The fuel problem is such a pressing social problem that every child in the nation should grow up knowing the outcome of a narrow, selfish fuel policy.

Objectives Concerning the Chief Household Fuels

To know the chief household fuels and where they are used.
To know the relative fuel value of the chief woods in a locality.
To give special attention to application of electricity as a fuel in regions where water power is abundant, as in the western states.
To know the cost of electricity in one locality in relation to the cost in other parts of the country.
To know the relative importance of the chief household fuels.
To become aware of the relation of coal to gas, and of both to electricity.

The Fuel Problem

Certain habits concerning preservation have penetrated the thinking of the people of our nation and there is evidence that these habits of mind have modified the conduct of our people. The preservation of the race, of the nation, of literature, of our national parks, and the like have gained acceptance in our institutional and governmental life. The needs concerned with fuel preservation have only begun to stir the *thinking* of our people, much less their inclination *to do* something about it.

Chester G. Gilbert and Joseph E. Pogue of the United States National Museum say that "this country has within its reach the means for effecting a saving in the matter of its energy supply of well over a billion dollars a year." [1] Most of the waste of energy considered here may be charged to industry, but it is reasonable to assume that industry will take steps to eliminate waste sooner than the body of domestic consumers. Indeed, all research and scientific skill in America thus far have been applied to the conservation of fuel in industry.

We have seen that there is an enormous waste of food in this country, but the waste of fuel is comparatively much greater. Much of this waste takes place before the fuel reaches the domestic

[1] Gilbert, C. G., and Pogue, Joseph E. — *The Energy Resources of the United States: A Field of Reconstruction;* Smithsonian Institution, Bulletin 102, I, 1, 1919.

consumer, and therefore should not be treated here, but this matter is of such importance that information concerning fuel waste should be widely disseminated. Concerning the waste of coal, D. M. Meyers, who was connected with the United States Fuel Administration, writes: "If all the well-known and well-tried methods of fuel conservation were put into effect throughout the United States, the resultant saving would amount to seventy-five to one hundred million tons per year in coal alone," which amounts to $450,000,000 in money value.[1] The coal supply of our nation is not inexhaustible. The most conservative estimate puts the available reserves of coal at 5500 times the present annual consumption.[3] Anthracite coal at the present rate of consumption will be exhausted in one hundred years.[2]

The recovery of natural gas, which is more than 70% of all gases consumed, is comparatively small. In connection with the production of oil there has been little effort to conserve the gas extracted. In the gas fields proper the small leaseholds and competing wells cause hasty extraction. It is important to conserve natural gas because it costs one-third as much as artificial gas and is twice as good.[3] When the gas reaches the 2,400,000 consumers, they use only 20% of the amount received; the rest is wasted.

In 1920 the petroleum resources of our country furnished for consumption the following products.

TABLE LXXIV

PETROLEUM CONSUMPTION 1920 [4]

PRODUCT	MILLION GALLONS
Gasoline	4256
Kerosene	1398
Gas and fuel	6704
Lubricating oil	609

[1] *Steam*, July, 1920, page 3.
[2] OWEN, ERNEST — "Energy Resources of the World and Their Utilization"; *Chemical Age*, July, 1921, page 284.
[3] GILBERT and POGUE — *The Energy Resources of the United States*, 50 f.
[4] Mimeographed report. United States Geological Survey, 1922.

The comfort of all the rural homes and many city homes is dependent upon petroleum. The operation of the machines in industry and of automobiles, of which there are one to every twelve inhabitants of our country, is also dependent upon petroleum.

A committee of the American Association of Petroleum Geologists and the United States Geological Survey have estimated that nine billion barrels of oil recoverable by methods now in use remained in the ground in this country on January 1, 1922. This quantity will satisfy the present requirements of the United States for only twenty years.[1] "Less than 25% of the petroleum underground reaches the pipe line. If we subtract from this proportion the losses involved in improper and wasteful methods of utilization, the recovery factor becomes perhaps as low as 10%.[2] Nearly 30% of the heat of the original gasoline is lost through the exhaust of automobiles. Thus a careful adjustment of carburetors would save about six hundred million gallons of gasoline per year. The Bureau of Mines estimated that 40 million barrels, 25% of the fuel oil burned in the United States, could have been saved by careful operation of boiler plants.[3]

Objectives Concerning the Fuel Problem

To build up a habit of mind in support of fuel conservation and preservation.

To learn that the supply of coal is limited.

To create public opinion which will enforce the conservation of natural gas.

To learn that the petroleum reserves will last no more than twenty years.

Lighting

Defective lighting in the home is very common. The result is discomfort and waste. The data which form the basis of proper management of lighting in the home are so definite, concrete, and convincing that there is no excuse for the present bad practices

[1] Mimeographed report, United States Geological Survey.
[2] Gilbert and Pogue — *The Energy Resources of the United States*, 69.
[3] Polakov, Walter N. — "Oil"; *New Republic*, XXXI, 68–70, June 14, 1922.

in the homes of our country. The important factors that determine good lighting are the materials burned, their intensity and mobility, and the danger in their use; the lighting apparatus used — flat flame gas jet, mantles, electric lamps, kerosene lamps; shades and reflectors, their composition, shape, and color; and the color of the walls. The consumer should know a little about these factors in order to know the standard for his own use and also to estimate the value of lighting systems which affect him. There are certain definite facts which point to definite knowledge and skills which the consumer should acquire.

I. MATERIALS OF ILLUMINATION

The common materials of illumination which are used are candles, kerosene lamps, gas flames, mantle gas burners, and incandescent lamps. The relative brightness of these sources of lighting has been numerically determined. It should be remembered, however, that brilliant lighting without proper shading and diffusion is harmful. The following table [1] gives the intrinsic brilliance of the common illuminants in candle power per square inch.

TABLE LXXV

RELATIVE BRIGHTNESS OF COMMON ILLUMINANTS

SOURCE	BRILLIANCE
Tungsten lamp	1500
Gem lamp	750
Carbon lamp	400
Welsbach light	30
Gas flame	7
Kerosene light	7
Incandescent frosted lamp	6
Candle	3

With regard to mobility, gas and electricity offer greater difficulties than kerosene or candles. Much waste and bad lighting is

[1] BELL, LOUIS — *The Art of Illumination;* Second Edition, 1912, page 12.

due to bad planning of the position of lights. Of course, it is possible to use extension pipes in connection with gas, but such use is cumbersome and dangerous. The use of extension wires in connection with electricity is simpler, as they often can be installed without much expense. When it is possible the householder should have several wall and floor sockets installed. The result is better, more economical, and more artistic lighting.

The several tables in this section indicate conclusively that tungsten lamps are superior to gem and carbon lamps; that the Welsbach mantle light is far superior to the flat gas flame; and that the kerosene mantle lamp is superior to the kerosene flame.

II. LIGHTING APPARATUS

Gas mantles are not universally used. In New York garment shops in 1915,[1] where at least as much intelligence is expected as is found in the average home, 67.4% of the tables illuminated with gas burned a flat flame. The superiority of the gas mantle to the flat flame is undeniably indicated in the tables of cost and intrinsic brightness.

To maintain a gas-mantle light requires a little attention. The best information as to common practices of the people with regard to gas mantles is reported by the United States Bureau of Standards, which made a study[2] of gas-mantle lighting conditions in 10 large cities, including 3174 units equipped with 6607 mantles. Of these, 1803 were maintained by the local gas company, and 1371 were maintained by individual householders. It was found that a lamp not regularly maintained by companies is likely to be defective five and one-half times as frequently as a lamp which is regularly maintained by companies. One in three lamps regularly maintained by companies was not in good condition. Lamps maintained by individual consumers showed a defect in every case. The common abuses of lamps were due to drafts, vibration, and dust in the atmosphere. The defects discovered were dirty, carboned, or broken mantles; dirty, cracked, or broken

[1] United States Public Health Service; *Bulletin No. 71*, page 133.
[2] United States Bureau of Standards; *Technological Paper No. 99.*

glass; and defective pilot lights. These defects result in a tremendous waste of gas and in deficient lighting.

Concerning the relative quality of mantles, results obtained from experimentation [1] with mantles made of cotton, ramie, and artificial silk show that the cotton mantle loses one-third of its light in a thousand hours, while the ramie and artificial-silk mantles show hardly any depreciation. When the purchaser has a choice he should select the ramie or artificial-silk mantle.

Shades and reflectors are important in illumination because they enable one to see better, because they eliminate the glare which is injurious to the eyes, and because they have the power to double the illumination. For these purposes it is not only necessary to shade every lamp but also to select such a shade as is of greatest usefulness. In the investigation of garment shops discussed in this section, 38.2% of the gas and electric lights were without shades or reflectors. Of the nine types of reflectors used in these shops, only three gave satisfactory illumination. The remainder did not reduce the glare adequately and did not reflect sufficient light for use. Shades are being manufactured and sold which neither shield the eye nor redistribute the light to any advantage. Cut-glass shades are of this type. A comparison of the porcelain and enameled tin shades of the conical type showed that the former gave a larger well-lighted area.

III. COLOR OF WALLS

The color of the walls plays an important part in the economy and quality of lighting. The color of the ceiling is especially important because of the great value of the light diffused downward. In discussing paints we saw that the several white pigments had varied reflective values. The colored pigments vary in their power to increase or decrease illumination. The bright colors increase illumination while the dark colors decrease illumination. Some of the important colors are given as follows, in order of their power to reflect light: light cream, light yellow, light greenish-yellow, light buff, light green, red, dark blue, green.

[1] Bell, Louis — *Art of Illumination;* Second Edition, 1912, page 110.

IV. RELATIVE COST OF SEVERAL ILLUMINANTS

When it is possible to choose a special type of illumination, the several common types should be compared for their relative advantages. For most people, cost is an important consideration; therefore the relative cost of lighting media should be known. From *Circular 55*, page 70, of the United States Bureau of Standards, we get the following table of comparative costs of illuminants at prices for one locality.

TABLE LXXVI

RELATIVE COST OF HOUSEHOLD ILLUMINANTS

MEDIUM	PRICE	COST OF 1000 CANDLE-HOURS (*Cents*)
Kerosene mantle . .	15 cents per gallon	6
Gas mantle	$1 per M cubic feet	6
Tungsten electric . .	10 cents per kilowatt hour	13
Kerosene flame . .	15 cents per gallon	20
Gas open flame . .	$1 per M cubic feet	25
Gem electric . . .	10 cents per kilowatt hour	27
Carbon electric . .	10 cents per kilowatt hour	37
Candle	12 cents per pound	200

Candles are very expensive lighting materials. Kerosene lamps provided with an incandescent mantle give three or four times as much light as the ordinary kerosene flame lamp. A gas mantle lamp gives more than four times as much light as an open gas flame and this advantage is further multiplied by the opportunity a gas mantle lamp offers for the use of a reflector. An inverted mantle gives more light downward, where it is wanted, than an upright mantle. Electric lighting by tungsten lamps is one-third as expensive as carbon lamps, and one-half as expensive as gem lamps, yet the latter continue to be used.

Objectives Concerning Lighting

To know the relative brightness of the chief illuminants.
To know the relative power of illuminants to approximate daylight.

To know the value of several electric outlets in walls and floors.
To use table and wall lamps.
To buy tungsten incandescent lamps in preference to carbon and gem lamps.
To use a gas mantle and never to burn a flat flame.
To use a kerosene mantle lamp.
To care for gas mantles properly by avoiding drafts, vibration, and dust; by keeping mantle chimneys clean; by replacing broken chimneys.
To purchase ramie and artificial-silk mantles in preference to cotton mantles.
To use shades and reflectors for gas and electric lights.
To select shades and reflectors which hide the glare of a lamp, which diffuse the light, and which have a high capacity to reflect light.
To use colored shades only for decoration.
To select wall and ceiling colors which have the highest power to reflect light.
To know the relative coefficients of reflection of the chief white and colored pigments.
To know the relative cost of lighting materials in one's local community.
To get adequate illumination.
To adjust lamps so that no direct light falls on a person.

Heating

It has been determined by experts that 68° is the most comfortable temperature in a living room. It is obvious that a room heated to a higher temperature is consuming more fuel than is required. To read a thermometer is simple; it remains but to universalize its use. In discussing ventilation it was reported that of 215 workrooms in New York, 73% were heated to a temperature over 73° F. and 29% over 80° F. This indicates the probable waste of fuel due to overheating.

It has been discovered that when a temperature of 68° is not comfortable it is necessary to humidify the air, by the evaporation of water, to a humidity of 44%. Indeed it is urged very frequently that a pan of water be kept boiling continually on the stove during the heating season.[1]

[1] Steele, B. L. — *Fuel Economy in Domestic Heating and Cooking;* Bulletin No. 32, State College of Washington; December, 1917, page 8.

The installation of a heating system is a problem for the small frame house which represents the typical American home. It is important, then, for the average person to know the several varieties of heating systems, their relative values, and the ones most suitable for different purposes. At present it is apparent that that heating system is used in a particular home which an energetic company has succeeded in selling to that home. Some facts concerning proper heating equipment are generally agreed upon and are set down here to indicate the probable objectives in training how to select a heating system.

The open fireplace is artistic, but most expensive of all systems to maintain, its efficiency being 5%.[1] The closed stove is more economical than the open fire. Hot-air furnaces are extensively used because they cost comparatively little to install and because they are simple to operate. For a small home they have proved satisfactory. The hot-air furnace in the long run, however, is not as economical as steam or a hot-water furnace, and should not, by all means, be used for a large house. For continuous heating it is wasteful to use gas. For intermittent heating or hot-water supply it is more convenient and usually more economical to use gas because it can be turned on and off for any period.

Objectives Concerning Heating

To know the most comfortable room temperature.
To own and to use a thermometer habitually.
To avoid overheating a room.
To know how to humidify the air.
To know the relative value of the several varieties of heating systems and their most appropriate uses.
To know the relative cost of installing the several heating systems.
To know the relative cost of maintaining the several heating systems.
To know that use of gas for continuous heating is wasteful.
To use gas for intermittent hot-water supply.

[1] *University of Tennessee Record*, XX, No. 5, January, 1918, page 8.

Relative Cost of Fuels

The cost and efficiency of fuels vary with the kind of fuel and the location. Information for each locality is available. It is possible to utilize results of experiments performed by experts, and in schools it is possible to obtain these results from direct experimentation. A. H. Barker, in a valuable book, *Domestic Fuel Consumption,* based upon English conditions, gives the following table of the relative cost of continuous heating.

Table LXXVII

RELATIVE COST OF CONTINUOUS HEATING OF AN AVERAGE ROOM

Fuel	Relative Cost
Coal fire	100
Gas fire	283
Gas radiators	84
Anthracite stove	46
Electricity	2,070
Radiator heat	33

It is possible to determine the most economical heating and cooking fuels in any community by calculations which take into account the efficiency of the equipment used, the heat value of the fuel, and the cost of the fuel. For example, Professor Steele of the State University of Washington published the following table, with a view to helping the people of his state to buy fuel economically.[1]

Table LXXVIII

COMPARATIVE COST OF FUELS IN THE STATE OF WASHINGTON

Fuel	Price	Fuel Value (B.T.U.)	B.T.U. for $1	Efficiency of Heater	Utilizable B.T.U. for $1
Coal	$10 per ton	12,000	2,400,000	35%	890,000
Wood	$10 per cord	5,800	1,595,000	35%	585,250
Electricity	1¢ per k.w.h.	3,412	341,200	100%	341,200
Electricity	½¢ per k.w.h.	3,412	682,400	100%	682,400

[1] Steele, B. L. — *Fuel Economy in Domestic Heating and Cooking;* Bulletin No. 32, State College of Washington, December, 1917.

It is seen that one item alone of price, fuel value, or efficiency of heater is no guide to economy. The combined effect of these three factors determines fuel economy. Fuel value and heater efficiency must be determined by experts, and made available for the housekeeper. The determination of actual cost is then a matter of simple calculation.

The illustration again is from Steele's paper. He gives here the fuel value of coal, wood, kerosene, and electricity costing $1 at retail prices prevailing in December, 1916. He also gives the efficiency of standard cooking appliances. The efficiency factor is constant and the heat value of fuels is constant. The price changes according to the community. The consumer should utilize the figures and make the simple calculations. The tables follow:

TABLE LXXIX

COMPARATIVE VALUE OF FUELS USED FOR COOKING IN WASHINGTON PRICES, DECEMBER, 1916

FUEL	B.T.U.'S FOR $1
Coal at $10 per ton	2,400,000
Wood at $10 per cord	1,595,500
Kerosene at 20¢ per gallon	678,570
Electricity at $3.85 per k.w.h.	88,673
Electricity at 3¢ per k.w.h.	113,730

TABLE LXXX

EFFICIENCIES OF COOKING EQUIPMENT

EQUIPMENT	EFFICIENCY
Coal range (entire space utilized)	18%
Coal range (for home cooking)	2.5%
Flame contact burners (kerosene)	25%
Electric heaters, surface	45% to 65%
Electric heaters, inclosed	70%
Electric heaters, immersion	90%

It is possible to make rough tests of economy in the home, and they should be encouraged. An example of such tests is contained in an article by S. S. Wyer, formerly of Ohio State University,[1] who made tests to determine the relative cost of fuels in cooking a dinner and breakfast and baking four loaves of bread. The table of costs follows:

TABLE LXXXI

RELATIVE COST OF FUELS FOR COOKING

FUEL	PRICE	PER CENT OF COST OF MEAL		
		DINNER	BREAD	BREAKFAST
Natural gas	40¢ per M cu. ft.	.5	1.2	.42
Soft coal	$6.50 per ton	1.7	6.0	3.56
Coal oil	15¢ per gallon	3.6	3.0	2.59
Gasoline	27¢ per gallon	3.0	5.3	3.69
Electricity	3¢ per k.w.h.	3.3	8.5	3.09

A further test of the relative cost of fuels is contained in *Bulletin No. 8* of the Kansas State Agricultural College, 1917. The experiment recorded in this bulletin is concerned with the cost of supplying hot water for a month. The table of costs follows:

TABLE LXXXII

RELATIVE FUEL COST OF SUPPLYING HOT WATER

FUEL	QUANTITY PER MONTH	COST PER MONTH
Soft coal ($8 per ton)	300 lbs.	$1.20
Kerosene (one burner, 15¢ per gallon)	15¾ gal.	2.36
Gasoline (20¢ per gallon)	19 gal.	3.80
Gas (automatic type heater, $1.25 per M cu. ft.)	2700 cu. ft.	3.38
Electricity (750 watt, at 2¢ per k.w.h.)		7.50

It has been seen that electric apparatus has a very high efficiency and that it has decided advantages of convenience. But the

[1] WYER, S. S. — "Relative Cost of Fuel Used for Cooking"; *Gas Age*, XL, 67–70, July 16, 1917.

cost of electric current is greater than that of any other fuel. The maximum economy in the production of electricity does not exceed an efficiency of 18%, that is to say, no more than 18% of the gas or coal used in generating electricity is recoverable for use as electric current. Even though this current after its generation from fuel can be used at an efficiency of 100%, the present use of gas for heating can exceed by 100% the efficiency possible with electricity[1] so generated. Electricity consumes more fuel at the electric plant to produce a given amount of heat than it would take to burn the fuel itself in the home in order to produce the same amount of heat. This does not apply to electricity when used for lighting.

It is extremely important, however, that the consumer should become aware of the possibilities of producing electricity by water power, which involves no destruction of fuel. "The present production of hydro-electricity in the United States represents roughly the equivalent of forty million tons of coal, whereas nearly four hundred million tons of coal go into the production of steam power and carbo-electricity power. The water power developed to date is about 10% of that readily available; scarcely 3% of the total open to development under elaborate arrangements for storage." [2]

"The water power of the United States, converted into electrical energy, is more than capable of turning every industrial wheel and illuminating every street and building in the entire country. The resource is country wide in distribution. . . . New England, the South Atlantic States, the Southwest, and the Pacific slope, together embracing half of the potential water power of the country, are practically without coal." [3]

Objectives Concerning the Relative Cost of Fuels

To know the relative cost of fuels in any locality.

To utilize the results of experiments in economic and effective use of fuels.

[1] Barker, A. H. — *Domestic Fuel Consumption*, 153.
[2] Gilbert, C. S., and Pogue, J. E. — *The Energy Resources of the United States*, 119.
[3] *Ibid.*, 118.

To know the relative efficiency of the chief heating apparatus.
To know the relative heat value of the chief fuels.
To calculate the actual cost of fuel for heating.
To make rough tests of fuel economy in the home.
To purchase coal by the ton.
To avoid using electricity except for lighting.
To learn of the possibility of generating electricity by water power.
To test electric and gas meters when a leak is suspected.

Electrical Materials and Supplies

We have seen that there were more than seven million customers who received electric current in 1917. These consumers are potential users of electrical materials and supplies. The tremendous growth of domestic electrical supplies is indicated by a statement from the census report for 1919, which is not given to sweeping generalizations. The census report says: "The most remarkable development in the entire (electrical) industry appears in household and industrial apparatus and devices." In value of products, the increase of 1919 over 1914 was 195%. In number of persons engaged in the industry, the increase for the same period was 188%, and in consumption of incandescent lamps, the increase was 223%. Several western power companies reported that 83% of the homes in the territory which they served were electrified.

The chief household electrical materials which the consumer commonly purchases are incandescent lamps, fuses, plugs, sockets, wiring, irons, vacuum cleaners, and toasters. A carbon lamp consumes three times the current of a tungsten lamp, yet carbon lamps to the value of $4,500,000 were consumed in 1919. Electric irons and toasters consume as much current as twelve 50-watt lamps, yet there were 4,000,000 users of electric irons and 480,000 users of toasters in this country in 1919.[1]

More money is expended by the nation for vacuum cleaners than for any other household appliance. The value of vacuum cleaners produced in 1919 was $21,842,000, which is about four

[1] *General Electric Review*, XXII, No. 3, page 188, March, 1919.

million dollars less than the value of refrigerators for the same year. There are a great number of vacuum cleaners on the market. In purchasing a vacuum cleaner one should compare the relative consumption of current as well as the design of the available types.

Objectives Concerning Electrical Materials and Supplies

To become acquainted with the chief articles of electrical equipment.
To ascertain the economy and other advantages of using new articles of electrical equipment.
To know how to purchase lamps, fuses, plugs, sockets, wiring, electric irons, vacuum cleaners, and toasters.
To select an electric vacuum cleaner on the basis of current consumption as well as design.
To know the varieties of the chief electric fixtures.
To test electric lamps by keeping records of service.
To know the meaning of a watt, volt, and ampere.
To know the size of a fuse necessary to prevent overloading the wires.
To prevent a short circuit.
To use an electric motor to supply power for sundry household purposes.

Safety in the Use of Fuels

The obvious danger connected with fuel consumption is fire. The per capita loss from fires in the United States is four times as large as that of England, which has the highest figure of all the European countries. The table follows:[1]

Table LXXXIII

PER CAPITA LOSSES FROM FIRES, 1913

Country	Per Capita Loss
United States	$2.10
England	.53
France	.49
Austria	.25
Italy	.25
Switzerland	.25
Holland	.11

[1] Straus, S. W. — *Annals of the American Academy of Political and Social Science;* January, 1920, page 192

The United States Bureau of Standards [1] reports that nearly four hundred thousand fires occur annually in the United States in about 2% of the buildings of the nation. The average fire loss per capita for the last 40 years has been $2 per year. Of the total number of fires, 54.74% occurred in homes. The following table gives some of the important causes of fire in the United States during 1918, as reported by the National Board of Fire Underwriters.[2]

TABLE LXXXIV

IMPORTANT CAUSES OF FIRE

CAUSE	PER CENT OF TOTAL LOSS
Exposure (including conflagrations)	22.51
Electricity	7.34
Matches, smoking, etc.	5.82
Stoves, furnaces, boilers, and their pipes	4.32
Defective chimneys and flues	4.24
Spontaneous combustion	3.62
Lightning	3.36
Unknown causes	33.10
Miscellaneous	15.69

There are no available figures to show the extent of accidents in the home or in public places due to electricity. The problem of accident prevention in industry is receiving considerable attention and does not concern us here because of the specialized nature of accidents in the various industrial plants. In the home the common dangers due to electricity are shock, which results from touching two parts of a live circuit with two parts of the body; and burns, which result from contact with live parts. The parts which usually cause accidents are fuses, switches, and loose or bad connections. Proper care and use of electric equipment will prevent accidents, and knowledge of how to treat the shock and burns will take care of such accidents when they occur.

[1] United States Bureau of Standards, Circular 75, page 93; *Safety for the Household.*

[2] National Board of Fire Underwriters; *Safeguarding America against Fire*, January, 1920, III, pp. 4–5.

The chief dangers from gas are asphyxiation, fires, explosions, and leaks. It is of importance to every gas consumer to know how to prevent such accidents and to meet an emergency connected with the use of gas.

Objectives Concerning Safety in the Use of Fuels

To reduce loss by fire due to ignorance of the use of electrical apparatus, matches, defective chimneys and flues.
To avoid electric shocks and burns.
To learn to use fuses and switches properly.
To treat shock and burns.
To prevent asphyxiation, explosions, and leaks.
To stop a gas leak.
To treat for asphyxiation.
To prevent accident in handling heating pads and electric toys.
To own and to use a fire extinguisher.
To treat a person whose clothes are on fire.
To make one's way through smoke.
To use blankets, water, sand, and earth in extinguishing fires.

Fuel Skills

The skills connected with the use of fuel are of great importance because they bear directly upon comfort, safety, and economy. We wish to ascertain what consumers now do with fuel and what they need to do. From our study of the fuel problem we shall get most of the data upon which we shall recommend changes in the management of the operations connected with the use of fuels in the home.

We have seen that gas is the chief household fuel, that coal is next in importance, and that together they furnish over 80% of the total heat energy utilized in the homes of the nation. Kerosene and wood are extensively used but no great problem in their utilization has been discovered. Electricity was found to be unimportant as a fuel in the homes of the nation at present but the rapid expansion of electric service indicates that the present

generation of school children will use electricity in the home very widely when they are ready to make homes for themselves.

From the point of view of present wasteful utilization of fuels we must recommend a body of skills which will correct our present ignorance and inaptitude. The reduction of the waste in the consumption of natural gas is dependent upon the skillful manipulation and care of the gas heating, lighting, and cooking apparatus. S. S. Wyer, who is a leading authority on the use of gas, states [1] that of 100 units delivered through the consumer's meter, 15 units are lost through leakage in house piping and fixtures; 68 units are lost through wasteful combustion conditions; and 17 units are actually utilized. The wasteful conditions of burning gas are: using gas at high pressures and in long flames for cooking; burning gas after cooking is finished; burning gas before food is ready to cook; not turning gas down after boiling begins; improper mixture adjustment; and useless radiation. Such of these serious defects which are not sheer neglect can be corrected by teaching every person to understand and manipulate the parts of a gas burner in order to get the right mixture of air and gas; to direct the flame properly; and to adjust the cooking vessel to the proper height above the burner. The importance of mantles, shades, and reflectors in connection with the utilization of gas for lighting has been discussed. It has been seen that economy, efficiency, and comfort demand that mantles be guarded against drafts, vibrations, and dust; that mantle chimneys be kept clean; and that broken chimneys be replaced. It has also been made clear that shades and reflectors can be adjusted so as to avoid glare and to increase illumination.

The maintenance of the heating system is a universal responsibility in the American homes. In the study [2] of 60 families made by J. B. Leeds the tasks connected with heating were distributed as follows: hot-air furnace, 30 families; hot water, 12; steam, 9; coal stoves, 8. The persons in charge of caring for the heating

[1] Wyer, S. S. — *Waste and Correct Use of Natural Gas in the Home;* United States Bureau of Mines (Technical Paper 257); page 19.
[2] Leeds, J. B. — *The Household Budget*, 61.

system were distributed as follows: husband, 30 families; husband and wife, 5; husband and son, 5; hired man, 5.

The waste of fuel in heating may be traced to ignorance of methods of maintaining the heating equipment and of retaining the heat which is generated. The stove and the furnace must be fired properly to avoid waste. Experts who have given attention to this problem agree that an even bed should be kept over the entire grate; that the fuel bed should not be disturbed too often; that the furnace should be fired lightly and frequently; that the ash pit should be kept clean to allow enough air for combustion and to prevent damage to the grate. The furnace itself loses heat when soot is allowed to collect on the heating surfaces, because soot is a non-conductor. The *Tennessee Record*, January, 1918, gives the following table of heat loss due to soot deposits:

TABLE LXXXV

HEAT LOSS DUE TO SOOT DEPOSIT

THICKNESS OF SOOT	LOSS PER CENT
$\frac{1}{32}$ in.	9.5
$\frac{1}{16}$ in.	26.2
$\frac{1}{8}$ in.	45.2
$\frac{2}{16}$ in.	69.0

The largest loss of heat is due to the lack of a check damper and turn damper or from the neglect to use them in stoves and furnaces. The following estimate of heat loss based upon tests is given as typical of the wasteful fuel consumer.[1]

TABLE LXXXVI

Heat lost up chimney due to improper regulation of dampers	40%
No covering of asbestos on heater or pipes	20%
Smoke pipe and heater flues covered with soot	10%
Live coals lost due to shaking ash pit	5%
Heat utilized	25%

[1] United States Fuel Administration: *Fuel Facts*, October, 1918, page 32.

Hot-water pipes lose much of their heat when they are not coated with asbestos. Cracks in stoves allow cold air to enter, thus wasting fuel. Improper use of the coal door and ash pit door results in waste of fuel. A broken grate should be promptly repaired because it results in the loss of coal.

Having taken measures to extract all the heat available in a given amount of fuel it is then important to know how to retain heat where it is to be used. The heat of a cook stove in warm weather need not be retained beyond the boundary of the cooking vessel. An appropriate screen will retain the heat within the desired limits. During the heating season it is necessary to keep the heat generated in and the outer cold air out. It is therefore valuable to know how to nail weather strips over cracks at doors and windows; to repair all loose-fitting doors and windows; to make a storm sash; to reduce all heat loss due to transmission through walls and windows; and to prevent excessive ventilation.

The data concerning the domestic use of electrical materials and supplies furnish the basis of our recommendations of skills necessary for the household use of electricity. The skills are associated with the use of the electrical articles chiefly consumed. These articles are lamps, plugs, sockets, wiring, irons, vacuum cleaners, and toasters. There is much mystery about the simple operation of an electric circuit which often causes the user of electricity much waste of time, inconvenience, and discomfort. There is no reason why every member of the family should not be able to replace a fuse when one is burned out. Proper manipulation of electrical parts will prevent a short circuit. Electric irons and toasters give much trouble unless pains are taken not to overload the wires, that is, to cause enough current to run through the wires to melt the fuse. To repair a socket and to install an extension wire are simple tasks which can be performed by any mature member of the household.

Objectives Concerning Fuel Skills

To repair a leak in a gas pipe.
To use the proper pressure in burning gas.

To adjust the spud to the pressure used.
To adjust the gas burner to get maximum light.
To adjust the gas burner to get maximum heat.
To manipulate the air shutter, spud, and burner to get the right mixture of air and gas.
To take proper care of mantles by guarding against drafts, vibrations, and dust; by keeping mantle chimneys clean; and by replacing broken chimneys.
To adjust shades and reflectors properly to prevent glare and to give maximum illumination.
To clear a carboned mantle.
To arrange the light units, when possible, according to use of light in the home.
To fire a stove or furnace properly by keeping an even bed over the entire grate, by firing lightly and frequently, by keeping the ash pit clean.
To save fuel by periodically removing soot from heating surfaces.
To use dampers properly.
To line hot-water pipes with asbestos or other insulating material.
To keep a stove in good repair.
To retain the heat of a cook stove by surrounding it with a screen.
To keep the heat within a room by the use of weather strips and storm sashes.
To use the coal door and ash-pit door properly.
To manipulate the slides in the coal and ash-pit doors to increase or check the fire.
To fire a stove economically.
To use skins of vegetables as fuels.
To care for the boiler.
To fill the boiler.
To humidify the air.
To use a switch.
To put in a new fuse.
To use a fuse of the right amperage.
To prevent overloading the wires.
To repair a socket.
To install an extension wire.
To install an electric bell or buzzer.
To read an electric meter.

Fuel Measurement and Calculation

In order to be more efficient in the purchase and use of fuels it is necessary to be able to perform certain simple calculations involving the use of fuel units. The relative importance of units and processes used in fuel calculation should follow roughly the relative importance of the several fuels used in the home. We have seen that as far as domestic use is concerned the fuels rank in the following order: gas, coal, wood, kerosene, and electricity.

The common unit used in connection with gas is the cubic foot. Coal is sold by the ton chiefly, though many families still buy in small quantities involving the use of the hundredweight and the pound. Wood is sold chiefly by the cord and in cities by the bundle or pound. Kerosene is sold by the gallon, quart, and pint, but the few more frugal consumers buy it by the barrel. Electricity is measured by the kilowatt hour. The electric lamp bears a label showing the number of watts required to make it burn. The 50-watt lamp consumes 50 watt hours in one hour, and one kilowatt hour in 20 hours. The fuses used in the home are stamped with the amount of amperes of current which may flow through the circuit without melting them. Blow-outs may be avoided by calculating the number of amperes flowing through a current at any one time by dividing the number of volts, which is constant in any one community, into the number of watts used at that time. The ampere and the volt, therefore, are units which will be used, not frequently to be sure, by the careful housekeeper. Finally, temperature is measured in degrees on the thermometer.

In discussing the relative cost of fuels it was shown that the consumer can ascertain for himself the most economical fuel for any particular purpose. The consumer, however, must have information which should be widely circulated but which at present is available only for the intelligent person. He must know the heat value of the fuels to be compared, in terms of British Thermal Units. He must know the efficiency of the apparatus used, in per cent. Finally, he must know the cost of a unit of the fuels to be compared. The process then consists of multiplying

the heat value in British Thermal Units, by the cost per unit in money, by the efficiency of the apparatus used for each system.

Of the numerical operations performed by 4068 persons of varying occupations reported by G. M. Wilson, 4.08% had to do with fuels.[1] The topics especially listed were coal, 122 times; electricity, 41 times; light, 38 times; and fuel, 382 times. The last item covers cases of calculation concerning lighting and heating when it was not certain whether the source was gas, electricity, or coal. This indicates that the families were definitely making calculations involving coal. Electricity and light, too, enter slightly into calculation. The figures show quite clearly that the families studied had not begun to calculate concerning gas, which we have seen is the chief household fuel.

We have seen that flat-flame burners and gas mantles vary in cost of operation. It is a simple matter to ascertain differences in the cost of appliances by comparing the meter readings of gas consumed in the operation of these appliances. It is important to be able to read a gas meter in order to check up defects in the equipment maintained by the gas company. The readings taken by the company inspector should be compared with readings taken regularly by a member of the household.

Concerning the purchase of coal, it is important to demonstrate to one's satisfaction that buying coal by the bag is not economical. Simple calculation will enable one to find out the difference in cost between a bag of coal and the cost of the same quantity when bought by the ton. It is only necessary to divide the number of pounds bought in the bag into the cost of a ton and then to compare the amount thus obtained with the amount paid for a bag of coal.

Electric current is recorded on a meter which is placed in every electrified home. It is essential to be able to read this meter. It is possible to compare the amount of current actually used with the amount recorded on the meter by multiplying the number of watts on the lamp label by the number of hours it is burned. A 50-watt lamp consumes 50 watt hours of electricity in one hour.

[1] WILSON, G. M. — *A Survey of the Social and Business Usage of Arithmetic*, 29.

Divide no. of bags in a ton into the cost of a ton!

Electricity is usually charged in terms of kilowatt hours (thousand-watt hours). Blow-outs are a great disturbance, but a little calculation will prevent such blow-outs as are caused by overloading the circuit. The fuse is a metal which melts at a lower temperature than copper, of which electric wire is made. When current flows it generates heat. In order to warn the consumer that the wires are becoming too hot and dangerous, the fuse melts and shuts off the current. The fuse bears a number showing the number of amperes of current which may flow through the circuit before melting it. The consumer must therefore limit the flow of electricity to the number of amperes recorded on the fuse. Toasters and irons have plates attached which show the amount of amperes which they consume. When lamps of high wattage are used, it is easy to ascertain the number of amperes flowing through the circuit by dividing the voltage or pressure into the wattage or the power and comparing with the number of amperes recorded on the fuse.

Objectives Concerning Fuel Measurement and Calculation

To use the following units in calculation: ton, hundredweight, pound, cord, gallon, quart, pint, barrel, kilowatt hour, watt hour, ampere, volt, watt, degree, British Thermal Unit.

To perform the numerical operations of addition, multiplication, subtraction, and division involving the units used in fuel calculations.

To calculate the relative cost of fuels when the heat value of the fuel, the efficiency of the apparatus, and the cost of the fuel are known.

To compare the meter readings of gas consumed in two or more alternative appliances.

To habitually check up the company inspector's reading of the gas meter.

To check up the loss in purchasing coal, wood, and kerosene in small units.

To read an electric meter.

To read a thermometer.

To calculate the amount of kilowatt hours of current used when the wattage of the lamp and the time it was burned are known.

To calculate the amount of current which flows through a circuit when lamps of high wattage, toasters, electric irons, and vacuum cleaners are used. To compare this figure with the number of amperes recorded on the fuse.

CHAPTER VIII

CONSUMPTION OF CLOTHING

Introduction

In our study of the economic objectives of education we have thus far arrived at conclusions concerning food, housing, household materials, and fuels. It is our present task to analyze the clothing habits of our people with respect to purchase and use; to compare these habits with accepted standards; and to recommend clothing objectives of education.

It will be more difficult to do this for clothing than for any other element of economic consumption because of the lack of established standards, the variety of articles of wearing apparel, the multiplicity of methods of production and grades of products, and the predominance of taste as a factor in consumption. It will appear sufficiently plain, however, that popular ignorance of proper clothing facts and habits still leaves much to be learned by our people.

Discussions of clothing are abundant and, therefore, it is not the purpose of this chapter to recapitulate what has already been written. It is the purpose here to present only sound data which exemplify good clothing habits or which set off bad clothing habits. It is not the purpose to suggest a clothing manual but rather to indicate what is good and bad in our consumption of clothing with the view of discovering specific objectives of clothing education.

Again with respect to clothing it is noteworthy that during the war some concerted action was taken to improve the mode of consumption as evidenced by practical attempts to modify trade practices and habits of purchase and use. The Commercial Economy Board urged the elimination of needless adornments, the avoidance of excessive multiplicity of styles, the reduction of the amount of cloth per garment, the limitation of fabric de-

signs and colors, and the use of reworked wool. It was estimated that this program would save 40% in materials for men's clothing and 25% for women's clothing. The willingness on the part of manufacturer and consumer to increase production and to reduce waste during the war is an example of an enlightened attitude toward clothing consumption which should transform the clothing industry into a public service and clothing purchase into an intelligent art. It is an attitude which our schools need to develop with the view to making the clothing of our people comfortable, durable, healthful, and beautiful.

Social Significance of Clothing

The duty of the school to train for effective clothing consumption is of special importance because of the social significance of clothing. That clothing has been seriously considered by thinkers is sufficient evidence that an attitude toward selection and evaluation of wearing apparel is a fundamental objective of education.

In our democracy we have made great progress toward breaking down the barriers of class, rank, and office as they are expressed in the outward costume of men and women. For the most part, in our country, uniforms are required only when they serve a special, useful purpose. Thus it may be said that the few who choose their clothes wisely join a new aristocracy of dress which takes in all classes. Yet we shall soon see that in design, weave, fabric, and workmanship the great mass of people continue to expose themselves to social disadvantage by their poor habits of purchase and use.

In the life of the community cheap clothing, tawdry clothing, torn clothing, ill-fitting clothing, and improperly kept clothing affect the social relations of men and women. Clothing is an extension of the personality. It is a powerful outward source of esteem. It is the force that sometimes brings men together or drives them apart. It often dictates whether there shall or shall not be the democratic informal association of men of different economic and social levels.

Because of the social nature of dress, false practices have developed which it is important to understand and to avoid. Thus it has come about that expenditure for display is more peculiar to dress than any other article of consumption. This condition is quantitatively demonstrated by the budgetary studies of workingmen's families made by L. B. More and R. C. Chapin, whose data show that the greater the income, the greater the proportion spent for clothing.[1] In the case of families above the wage-earning class the decline in the percentage spent for clothing is more gradual as the income increases than the percentage spent for food or fuel.[2] When one considers that clothing is nearest to the person, that it is exposed at all times, and that it enters into more social situations than any other economic commodity, it becomes evident that display is a predominating factor in dress. This does not excuse the particular form which display takes in the people's lives which arises from ignorance, lack of initiative, and commercial pressure. On the contrary, it emphasizes the importance of inculcating a sound attitude of display. The particulars of such an attitude will be suggested later as items of knowledge and skill.

The very abstract quality of expensiveness is sought because it stands as a symbol for social approval. The value of clothing in the market is derived as much from fashionableness as from utility. So it will be important to build up, as we go along, sound standards of value of clothing.

I. FASHIONS IN CLOTHING

Of all the superficial values which we have come to attach to clothing, that of fashion requires special treatment because it has obtained a formal position in the economics of the clothing industries. The mass of the people succumb to fashions innocently and unwittingly. It is therefore clear that they should know by what deliberate designs they are ensnared.

[1] More, L. B. — *Wage Earners' Budgets*, 246; and Chapin, R. C. — *Standard of Living among Workingmen's Families in New York City*, 162.
[2] National Bureau of Economic Research; *Income in the United States*, II, 26.

As an illustration we shall trace the process of the setting and adoption of styles of women's clothes. The couturier shows his new designs in Paris early in February. These designs are based on a novel event of general interest. They furnish the leading motifs for the clothing of the fashionable people on the Riviera. Later in the season the most highly approved of these motifs appear at the various fashionable resorts.

The costume designer employs a variety of methods to gain approval for his creation. He attempts to sell his costume to a royal or titled person or to gain its acceptance by a popular actress. More commonly he places his new creation on a model who appears in public places in Paris. Style reporters, mill representatives, manufacturers, and buyers are on the watch for new creations. In June there is a second showing for the benefit of early American tourists. By this time the fashion for the season has been determined and begins to appear in the clothing of the people.[1] The same process is begun in August for fall and winter clothing.

It is obvious that fashions are motivated by the upper classes. Consequently they are based predominantly on display, conspicuous waste, leisure, novelty, and expensiveness. For the mass of the people these attributes are not only unserviceable but what is more important, economically unattainable. Consequently for the mass of people, style is foreign to their intrinsic needs and expensive to follow. But the manufacturer and the consumer conjointly are responsible for the periodic changes of costume. They both conspire to produce cheaper fabrics to imitate the fashion of the rich.

The men and women who participate in the social life of the community cling to the predetermined clothing designs with superstitious fear. They buy what is promulgated as the style. They are responsible for style, only in so far as they adhere religiously to it. They do not dictate it. Obviously, artistic choice is limited to selection of color and to slight alterations and trimmings, which are also limited by the fashion. Thus is created

[1] Cherington, Paul T. — *The Wool Industry*, 164 f.

the very kind of slavish standardization which, it is charged, will result from the adoption of staple fabrics and garments.

The economic effect of fashions is so significant that on this account alone it ought to become an important school problem. The creators of styles "probably wield a greater influence economically than any group of corresponding size in the world." The price of novelty goods bears no relation to the cost of manufacture, the emphasis being placed upon skill in design and not upon reducing costs. The goods are not manufactured for stock. When it comes to selling the goods the emphasis is on speed of sale to cover the style risk. Indeed, Mr. Cherington thinks that "perhaps the most important single factor in increasing the losses in the dry-goods trade in its present form is the style risk. On the other hand, the commercial emphasis in the sale of staples such as serges is on volume. The price is based on the cost of raw materials and manufacture and becomes standardized." [1] Quantitative evidence of this condition is found in the study made by the United States Tariff Board in 1912. The Board reported that the total cost of cloth and woolen materials, taken as a whole, was equal to about 40% of the cost of ready-made clothing. In the special case of women's clothing, however, the cost of cloth was from 20% to 35% of the total cost of the ready-made garment. The selling expenses of women's clothes are greater than men's clothes but their intrinsic value is the reverse.[2]

The selfish attitude of tradesmen toward styles is pitilessly revealed in the following statement: "Nothing would more stagnate trade in general than a single standard in dress lasting for years. Clothes would then have to wear out, with a consequent lessening of turnover for every business connected with the supply of women's wants. Taking the trade as a whole it makes very little difference, but taking the component parts individually, it may mean a vast loss on profit." [3]

From the point of view of economy, then, the consumer should know that fashions are an extra expenditure in payment for ar-

[1] Cherington, Paul T. — *The Wool Industry*, 101, 153, 163, 168.
[2] United States Tariff Board; *Report on Wool and Wool Manufactures*, I, 18, 1912.
[3] *Printers' Ink*, October 12, 1922, page 12.

tificial social values, for ignorance of standards of selection, and for lack of courage to follow one's own taste. It is a real problem of education to develop the habit of selecting clothing because of its intrinsic utility and its singular æsthetic value.

Objectives Concerned with the Social Significance of Clothing

To know the effect of cheap, tawdry, torn, ill-fitting, and ill-kept clothing on the social relations.
To consume clothing for its intrinsic worth rather than for display.
To differentiate between expensiveness and real worth in clothing.
To understand the nature of fashions in clothing.
To know how fashions are created.
To ascertain the relation of fashions to the clothing needs of the mass of people.
To know how fashions affect the wearing quality of clothing.
To know the effect of fashions on individual choice of clothing.
To know the effect of fashions on the economics of the clothing industry.
To know the effect of staple fabrics and novelty fabrics on price.

Comparison of Actual with Standard Consumption of Clothing by the People of the United States

I. ACTUAL CONSUMPTION

For information concerning the habits of consumption of clothing by the people of our nation we again turn to the Census Report of Manufactures. These data, combined with figures of foreign commerce, give us unmistakable data concerning clothing consumption in the United States. The table shows the chief articles of clothing consumed in the United States as determined by money value of the articles consumed. We find that women's clothing ranks first, men's clothing ranks second, and is followed by boots and shoes, hosiery, millinery, shirts, underwear, and so on. We have here our first index of the relative importance of the several articles in our scheme of clothing consumption. We also have a graphic picture of how the nation spends its money for clothing.

TABLE LXXXVII

CLOTHING CONSUMED IN THE UNITED STATES, 1919

ARTICLE	VALUE OF PRODUCTS CONSUMED (DOLLARS)
Women's clothing	1,204,279,803
Men's clothing	1,152,583,889
Boots and shoes	1,079,895,076
Hosiery	270,974,886
Millinery, lace goods	253,325,970
Shirts	205,327,133
Underwear	196,481,465
Fur goods	180,610,075
Hats and caps	164,516,950
Rubber boots and shoes	111,651,835
Men's furnishing goods	107,834,695
Gloves	99,320,111
Corsets	72,661,101
Suspenders, garters	60,774,652
Sweaters	58,156,000
Collars and cuffs	46,793,730
Rubber clothing	8,824,430

II. CLOTHING OF THE PEOPLE AS REVEALED IN SURVEYS

Following roughly the classification of clothing as given in the preceding table the results of a direct study of clothing practices are here presented. Several surveys give detailed information concerning the quality and cost of clothing worn by various groups of families but because the data are minute and lengthy the figures for the most comprehensive study, only, will be presented. This is the study[1] of 12,094 workingmen's families in 92 representative localities, made by the United States Bureau of Labor Statistics in 1918 and 1919. In order to simplify the table certain items presented separately in the original table will be grouped under one head. For example, *felt hats*, *straw hats*, and *caps* will be combined under the heading *hats and caps*. The data contained in the table will be compared with standard data and the conclusions will be made as each item of clothing is discussed separately.

[1] United States Bureau of Labor Statistics; *Monthly Labor Review*, September, 1922, page 49 f.

Table LXXXVIII

Quantity and Cost of Clothing Bought by a Workingman's Family
(December, 1918)

Item	Man			Boy (12–15)		
	Number of Articles per Person	Cost per Person	Cost per Article[1]	Number of Articles per Person	Cost per Person	Cost per Article
Hats and caps	1.5	$3.56	$3.23	1.9	$1.56	$1.57
Suits	1.3	19.58	26.54	1.76	12.68	10.12
Overcoats	.23	4.22	22.38	.3	2.33	10.08
Raincoats	.1	.47	8.57	.1	.24	4.13
Sweaters	.2	.96	4.39	.4	1.30	3.09
Shirts	4.25	6.35	1.31	4.18	3.37	.86
Underwear	3.4	4.14	1.22	2.56	2.71	1.06
Socks	11.15	3.60	.32	10.00	3.62	.36
Shoes, etc.	2.61	12.32	11.29	3.56	11.88	3.57
Rubbers	.4	.53	1.28	.6	.59	.94
Gloves	4.5	1.76	2.04	4.5	.59	.58
Haberdashery	14.4	3.99	.27	14.4	1.81	.22
Pajamas	.4	.64	1.65	.4	.41	1.11
	Woman			Girl (12)		
Hats	1.34	5.25	4.42	1.3	2.40	
Suits	.25	5.86	24.97	.003	.017	
Skirts	.6	2.68	6.29	.151	.191	
Waists	1.71	3.96	3.36	.412	.423	
Dresses	.8	6.11	13.57	.43	7.63	
House dresses	3.0	3.66	1.55	.3	.17	
Coats	.35	6.92	23.61	.4	3.82	
Raincoats	.01	.04	7.75	.05	.16	3.55
Sweaters	.15	.58	5.97	.302	.98	
Furs	.03	.57	18.24	.04	.22	5.56
Petticoats	.91	1.33	1.66	1.701	1.22	
Corsets	.9	2.13	2.35	.01	.01	.87
Underwear	5.89	4.31	.73	5.044	2.793	
Night clothes	1.21	1.48	1.72	.941	.741	
Kimonos	.11	.40	2.23	.034	.01	
Stockings	6.35	2.98	.37	8.02	2.71	
Shoes	2.22	10.44	5.34	3.4	9.67	
Gloves	.73	1.03	1.88	.83	.49	
Rubbers	.3	.30	.91	1.1	.64	
Handkerchiefs	.3	.02	.09	3.3	.33	.10

[1] See Footnote 4, page 233.

III. SOME STANDARDS OF CLOTHING CONSUMPTION

Following the direct study of clothing practices of more than 12,000 representative American families, three standards are presented showing an adequate quantity and quality of clothing for the man, woman, boy, and girl. These particular standards were selected for their reliability and because they exemplify current high, medium, and low estimates of the needs of wage-earners. The first and third standard budgets are comparable as to quality of clothing listed because the prices are given for approximately the same period, the fall of 1918. The second standard budget, that of the United States Bureau of Labor Statistics, is based on prices of August, 1919. It has, therefore, been necessary to convert these prices so that they would be comparable to those given in the other studies of standards of clothing consumption.[1]

IV. COMPARISON OF ACTUAL WITH STANDARD CONSUMPTION OF CLOTHING

It will appear from a comparison with the data taken from the survey immediately preceding that there are inferences to be drawn concerning the habits of the people of the nation both with respect to quantitative considerations which suggest themselves obviously and qualitative considerations which will correlate with later conclusions. Like the data from surveys they are detailed and unwieldy. Therefore the comparison will be undertaken later, piecemeal, by articles of clothing.

Roughly, the conclusions from the comparison of the actual conditions with the standard conditions show two general deficiencies. First, wage-earners do not consume a sufficient quantity of about a half-dozen important articles of clothing. Second, as indicated by the amount of money paid for garments, wage-earners buy clothing which is of inferior quality. The articles of clothing underconsumed by men are: straw hats, underwear,

[1] The conversion of prices was made in accordance with the annual index numbers of clothing prices given on page 22 of Volume II of *Income in the United States*, published by the National Bureau of Economic Research.

TABLE LXXXIX

CLOTHING STANDARDS

	PHILADELPHIA (WOMAN)[1]			U. S. BUREAU OF LABOR (WOMAN)[2]			NATIONAL INDUSTRIAL CONF. BD. (WOMAN)[3]			PHILADELPHIA (GIRL–10)[1]		
	PRICES, SEPT., 1918			PRICES, AUG., 1919			PRICES, NOV., 1918			PRICES, SEPT., 1918		
	NO. OF ARTICLES	COST PER PERSON	COST PER ARTICLE[4]	NO. OF ARTICLES	COST PER PERSON	COST PER ARTICLE	NO. OF ARTICLES	COST PER PERSON	COST PER ARTICLE	NO. OF ARTICLES	COST PER PERSON	COST PER ARTICLE
Hats	1.5	$3.25	$ 3.50	1.5	$15.00	$ 9.00	2.0	$3.60	$1.80	2.0	$2.25	$1.12
Suits	.5	8.00	16.00	.5	31.00	63.60						
Skirts	1.0	5.00	5.00	.5	3.00	6.00	1.0	2.00	2.00			
Waists	3.5	3.50	.75	3.5	4.50	9.00	2.0	3.30	1.65			
Dresses	2.5	4.38	1.75	2.5	27.00	30.00	.5	5.00	10.00	8.0	10.00	1.25
House dresses, aprons, etc.	3.0	4.50	1.50	2.0	7.20	3.60	5.0	6.60	1.32			
Coats	5.0	7.50	15.00	.3	20.00	60.00	1.0	26.25	26.25	.5	3.75	7.50
Raincoats												
Sweaters										1.0	2.00	2.00
Furs												
Petticoats	2.0	3.00	1.50	2.0	6.00	3.00	2.0	2.25	1.13	4.5	3.25	.72
Corsets	1.0	2.00	2.00	1.0	7.20	7.20	2.0	3.50	1.75			
Underwear	7.0	5.05	.75	9.0	11.46		7.0	8.40	1.20	11.0	6.10	
Night clothes	2.0	2.50	1.25	2.0	3.60	1.80	3.0	4.50	1.50	2.0	1.50	.75
Kimonos				.5	2.70	6.60						
Stockings	9.0	2.25	.25	8.0	6.24	.78	6.0	3.10	.50	12.0	3.60	.30
Shoes	2.0	10.00	5.00	2.0	21.00	10.80	1.5	9.00	6.00	4.0	16.00	4.00
Gloves	1.0	.75	.75	1.5	2.70	1.80	1.0	3.00	3.00	1.0	.75	.75
Rubbers	1.0	1.00	1.00	1.0	1.80	1.80	1.0	.95	.95	1.0	.75	.75

TABLE LXXXIX — *Continued*

	Philadelphia (Man)[1]			U. S. Bureau of Labor (Man)[2]			National Industrial Conf. Bd. (Man)[3]			Philadelphia (Boy–13)[1]		
	Prices, Sept., 1918			Prices, Aug., 1919			Prices, Nov., 1918			Prices, Sept., 1918		
	No. of articles	Cost per person	Cost per article[4]	No. of articles	Cost per person	Cost per article	No. of articles	Cost per person	Cost per article	No. of articles	Cost per person	Cost per article
Hats and caps	2.0	$ 2.63	$ 2.25	1.5	$ 2.00	$ 4.00	2.5	$ 6.25	$ 2.50	2.0	$ 1.76	$ .88
Suits	1.5	21.00	16.50	1.0	40.00	40.00	1.5	33.00	26.50	1.5	13.13	8.75
Overcoats	.33	5.50	16.50	.25	10.00	40.00	.33	6.66	20.00	.5	5.00	10.00
Raincoats				.16	2.50	15.00						
Sweaters	.5	2.50	5.00				.5	2.50	5.00	.5	2.50	5.00
Shirts	6.0	9.30	1.50	5.0	10.00	2.00	5.0	8.00	1.60	5.0	4.25	.85
Underwear	4.0	7.80	1.50	4.0	8.00	2.00	5.0	8.05	1.61	5.0	4.70	.94
Socks	12.0	3.00	.25	12.0	6.00	.50	8.0	2.25	.28	18.0	4.50	.25
Shoes	2.0	11.00	5.50	1.5	11.25	7.50	2.0	12.00	6.00	4.0	18.00	4.50
Rubbers	1.0	1.50	1.50	.5	.63	1.25				1.0	1.00	1.00
Gloves	1.0	1.00	1.00	.5	1.50	3.00	1.0	2.25	2.25	1.0	.75	.75
Haberdashery	16.5	4.95	.25	26.3	8.45		7.0	2.75	.39	10.5	1.95	
Pajamas	2.0	2.00	1.00	1.0	2.50	2.50	2.0	2.70	1.35	2.0	1.80	.90
Extra trousers										3.0	3.50	

[1] Bureau of Municipal Research; *Workmen's Standard of Living in Philadelphia.*
[2] Bureau of Applied Economics; *Standards of Living*, 33–36.
[3] National Industrial Conference Board; *Research Report No. 22.* Prices taken from *Research Report No. 14.*
[4] When several grades of the same article are included under an item the price of the grade of article most frequently designated is used in the cost per article column.

night clothes, collars, handkerchiefs, and umbrellas; by women: dresses, skirts, underwear, rubbers, and handkerchiefs; by boys: caps, suits, pants, overcoats, night clothes, stockings, shoes, rubbers, gloves, and handkerchiefs; by girls: hats, sweaters, dresses, underwear, night clothes, stockings, shoes, and handkerchiefs. Shoes for men and women are bought to an amount greater than the standard.

The articles of clothing which by price standards appear to be of inferior quality for men are: suits, overcoats, raincoats, shirts, pajamas, socks, and shoes; for women: hats, suits, raincoats, waists, dresses, petticoats, corsets, stockings, shoes, and rubbers; for boys: caps, suits, overcoats, shirts, stockings, and shoes; for girls: petticoats and shoes. Hats for girls are superior to the standard.

Objectives Concerned with the Quantitative Study of the Clothing of the People

To know the chief articles of clothing consumed by the people of the United States and the significance of these items in our industrial life.

To observe objectively the clothing habits of the people of our nation.

To become familiar with approved standards of clothing consumption.

To use the facts revealed by clothing standards to form opinions on wages, production, and other economic problems.

To consume a sufficient quantity of the important articles of clothing, especially underwear, night clothes, handkerchiefs, dresses, skirts, rubbers, and sweaters.

To buy the best quality of clothing consistent with the income of a family.

Clothing and the Budget

The annual expenditure for clothing varies for different families. Minimum standards of clothing expenditure for a family have been proposed. These can be used only in the roughest way.

The minimum clothing allotment, according to five of the proposed standards, was found to be $393.86. The difference in cloth-

ing prices is accounted for by converting the sums allotted to clothing to a common price level, that of 1919, in accordance with index numbers worked out by the National Bureau of Economic Research.[1] Since the annual allowance for clothing is 20% of the total budget, it would require an income of $1995 to purchase the standard clothing equipment in terms of 1919 prices. In order to apply this figure to the table of distribution of income among the families of the nation in 1910, it was necessary to reduce it to the price level of 1910 by using the index numbers of retail prices worked out by the National Bureau of Economic Research.[1] This process showed that an income of $1134 was necessary to purchase a standard clothing outfit in 1910. Comparing this figure with King's table, it appears that 77.91% of the families of the nation do not have a sufficient income to clothe themselves in accordance with the proposed standard. The reader should bear in mind that the conclusion represents a mathematical fact which must be interpreted carefully. There is no doubt, however, that our data reveal a strong obstacle in the attainment of adequate clothing habits by our people.

This general conclusion is borne out by two studies which touch on this matter. The United States Bureau of Labor Statistics made a study of the cost of living of 2110 families in which the chief wage-earner made no more than $1800. It appeared that 69.6% of the men spent less than $50 for clothing, on which amount a man can "barely clothe himself," and that 70.7% of the women spent less than $40 for clothing, which barely clothed a woman.[2] Of the 318 families studied by R. C. Chapin in New York City in 1908, 40% report that they spent less than $100 for clothing, which was the minimum standard used in that study.

Two direct examples of the discrepancy which exists between actual and necessary expenditures for clothing are furnished directly in the tables already given. The Philadelphia standard is based upon the study of the habits of the 260 families recorded among the table of surveys. The discrepancy between the stand-

[1] National Bureau of Economic Research; *Income in the United States*, II, 22.
[2] United States Bureau of Labor Statistics; *Monthly Labor Review*, November, 1917, page 1 f.

ard, which is $299.43, and the actual clothing allowance, which is $175.64, is explained first on the ground of difference in price; second, on knowledge that considerable quantities of clothing were received as gifts; and third, by the fact that families did not report the use of clothing which a fair standard demands. The clothing standard of the U. S. Bureau of Labor Statistics was determined after the completion of the survey of 12,096 families. The standard allots $513.72, while the families actually spent $238.10. It is noteworthy that the people spend, and perhaps only can spend, 46% of the amount they should for proper clothing.

It is true, however, that too much money is spent on the wrong kind of clothing. It would, therefore, not be safe to recommend categorically that the allotment for clothing be increased, for that would only increase the waste in money spent for clothing. An increase in the annual expenditure for clothing by the working population would be helpful only if they improved their knowledge and habits of clothing purchase. Such increase, furthermore, would have to be accompanied by such a readjustment of budgetary habits as would make it possible for the worker to buy medium-grade instead of low-grade garments.

Whereas, the percentage of the income spent for clothing by the people is less than the percentage recommended in the standard budgets, it would in general do no great good to increase it because it would still fall far short of the amount necessary for a minimum allowance for adequate dress. It is only possible to reiterate the need for disseminating broadly the knowledge of the minimum clothing standard in the hope that it will become generally recognized and approved, and finally, that it will become an accepted economic principle. The readjustment is far more subtle than one would expect, but that is no reason why the process should not be furthered by the schools.

Table XC

Family Expenditures for Clothing

Study Made By	Standard Allotment for Clothing[1]					
	Date	Total Income, Dollars	Amount Allotted for Clothing	Per Cent for Clothing	Income Converted to Prices, 1919	Clothing Allotment Prices, 1919
U. S. Bur. of Lab. Statistics	Aug. 1919	2262	513.72	22.7	2262	513.72
William F. Ogburn . . .	Jan. 1920	2243	455.32	20.3	2028	340.69
Phila. Bur. of Mun. Research	Sept. 1918	1637	299.43	18.3	1807	359.38
Nat'l Indus. Conference Bd.	Oct. 1919	1574	322.25	19.2	1574	322.25
Seattle Arbitration Board	Oct. 1917	1506	291.50	19.3	1918	432.04
Labor Bureau, N. Y. C. .	Nov. 1920	2633	529.17	20.1	2380	395.09
Average				20.0	1995	393.86

[1] Standards: National Industrial Conference Board; *Research Report No. 22*, page 7.
"Seattle Board of Arbitration" in Lauck, W. J. — *Cost of Living and the War*, 120.
Philadelphia Bureau of Municipal Research; *Workmen's Standard of Living in Philadelphia*, 38.
United States Bureau of Labor Statistics, August, 1919, in National Industrial Conference Board; *Research Report No. 41*, Table 3.
National Industrial Conference Board; *Research Report 41*, Table 3.
Labor Bureau, New York City, in National Industrial Conference Board; *Research Report No. 41*, Table 3.

Table XCI

Amount Actually Spent for Clothing as Shown in Surveys[2]

Study Made By	Date	Number of Families Studied	Total Income, Dollars	Amount Allotted for Clothing	Per Cent for Clothing	Income Converted to Prices, 1919	Clothing Allotment Prices, 1919
U. S. Bur. of Lab. Statistics	1916	1,481	1216	119.17	9.8	1984	217.59
U. S. R. R. Wage Com. .	1917	265	1210	185.34	15.3	1542	270.10
Phila. Bur. of Mun. Research	1918	260	1262	175.64	13.9	1312	210.85
U. S. Bur. of Lab. Statistics	1919	12,096	1434	238.10	16.6	1434	238.10
Average					13.9	1568	234.16

[2] United States Bureau of Labor Statistics, 1916, quoted in National Industrial Conference Board; *Research Report No. 41*, Table 2.
Philadelphia Bureau of Municipal Research, quoted in National Industrial Conference Board; *Research Report No. 41*, Table 2.
United States Railroad Wage Commission; *Report to the Director General of Railroads, 1918*, page 93.
United States Bureau of Labor Statistics; *Monthly Labor Review*, August, 1919, page 118.

Objectives Concerned with the Place of Clothing in the Budget

To consider solutions to the condition in our economic plan which makes it impossible for a great body of the people of our nation to dress adequately.

To adjust the family expenditure to make it possible to buy more and better clothes.

To understand the power of clothing intelligence to help overcome some of the disadvantages of an inadequate income.

To adjust the habits of clothing expenditure with a consideration of the durability of garments.

Qualitative Standards of Clothing

Before we are ready to undertake to make specific recommendations concerning the modification of the clothing habits of our people it is necessary to observe certain general norms of quality. A comparison of consumers' habits as reflected in the trade practices when compared with standards of quality will show the consumers' present needs. These practices and standards are generally known to clothing experts and to the more progressive members of the trade. They will be included in this study only when they point definitely to the need of a change of habits in the selection and use of articles of wearing apparel.

I. DURABILITY

Durability is a primary factor in determining the value of clothing. When the British Board of Trade made an investigation of the cost of living in American towns it observed that clothing does not cost much more in the United States than in Great Britain but is often less durable. They found, furthermore, that the practice of buying clothes that are expected to last for a single season only and not for two or more is much more common in the United States than in Great Britain.[1]

We shall see that the several fibers used in clothing have varying intrinsic strengths. When the fiber is made into yarn it may be

[1] Great Britain Board of Trade; *Cost of Living in American Towns*, page LXXV, 1911.

one-ply, two-ply, or three-ply, yielding strength in the same proportions. The yarn may be made from the short or the long fiber, the former yielding the more durable fabric. The weave may, by its very nature, give a stronger fabric. The twill weaves, for example, invariably are closer in texture than the plain weaves. The number of threads to the inch determines the weight of the fabric, the closeness of the weave and, therefore, the durability. The presence of weighting and sizing materials, when recognized, is a sign of durability. These factors will be taken up first in connection with textile fabrics and later in connection with specific garments.

II. HYGIENIC PROPERTIES

The hygienic factor never occurs alone in clothing selection. It predominates in the selection of certain specialized clothing, such as raincoats, rubbers, gloves, and underwear. For the consumer it is important that he shall know when a garment has a marked hygienic defect. A garment should maintain the body at a constant and comfortable temperature. Experiments performed by Florence Caton to discover the relative heat conductivity of linen, cotton, silk, and wool showed that wool was the poorest conductor of heat, followed in order by light wool, heavy silk, light silk, heavy cotton, and light cotton. Fibers with smooth surfaces were found to be better conductors of heat. The plain weave was found to be a poorer conductor of heat than the knit and the basket weave.[1]

Then, too, it is known that several layers of light garments are warmer than a single layer of a heavy material because air is a poor conductor of heat. For the same reason a nap gives greater warmth to a garment, the air being retained within the meshes of the nap. The color of the garment affects the body temperature. White and green garments throw off the sun's rays, while red, orange, and black retain them.

The body gives off four pints of perspiration per day, which is absorbed by the clothing and finally evaporates. This condition

[1] CATON, FLORENCE — *Journal of Home Economics*, June, 1921, pages 252–255.

should affect the selection of undergarments especially because wet garments are uncomfortable and cause colds. Florence Caton's experiments showed that linen absorbed water most rapidly and that evaporation from it proceeded most rapidly. Wool absorbed water very slowly and evaporation was slow. Silk and cotton were midway between wool and linen in properties of absorption and evaporation.

The elasticity of the fiber and of the garment determine whether the muscles of the body will move freely and whether breathing and heart action will be restricted. The weight of the garment also affects the body movement. Heavy clothing is a factor in the cause of fatigue, especially when the weight hangs from the hips. The finish of a material determines whether it can easily be kept clean. For instance, a lustrous finish sheds dust easily.

The special problems of preventing sickness from insufficient or improper clothing have to do with garments to wear for rain, for snow, for cold weather, for hot weather, for damp weather, and for windy weather. These conditions are universal and while it is impossible to ascertain to what extent the people clothe themselves properly to meet these conditions, it is safe to check up on clothing habits on days when special clothing is necessary.

Much of the hygienic quality of clothing depends upon its care and upkeep after it has been purchased. We shall later try to ascertain exactly what skills one ought to acquire in order to care for clothing properly. We shall also discover that the quantity of each article bought by the average family does not allow for adequate change of underwear, handkerchiefs, towels, stockings, etc., to meet the common hygienic requirements.

III. LAUNDERING PROPERTIES

The several fabrics have varying laundering properties. Flannel shirts and trousers are laundered but not as easily as cotton shirts and trousers. Cotton can stand rubbing and soaping well. Wool cannot stand hot water, alkalis, or strong soaps. It hardens when rubbed or run through rollers. Silk requires great care

in laundering. Artificial silk breaks down completely when laundered. Linen does not shrink when laundered. It is more easily laundered than cotton and becomes more lustrous after repeated laundering. Certain adulterants used in finishing cloths break down after the first laundering. Enough has been said at this time to indicate that it is necessary to anticipate the laundering process when purchasing clothing or materials.

IV. BEAUTY

The problem of the development of good taste in the selection of clothing is especially important for the great mass of people because the satisfaction which comes from fabrics of fine texture and weave is limited. They must depend chiefly upon design of the garment and color. In this way the low- and moderate-priced fabrics can take on added beauty and give added joy.

Proper color selection is the result of observation and experience. Much comes from knowledge of the basic facts, some of which will be presented here, but good taste develops only by practice. Development of good taste can be done simply in connection with clothes which pupils actually wear.

Color combinations have a decided effect on appearance. This nobody will deny. That this relation is not understood and pursued as an art is due, first, to the predominance of the fashionable colors; second, to the infrequency of combinations which are markedly agreeable or disagreeable; and third, to the natural limitation of most people in analyzing subtle elements such as the harmony of colors. Therefore, inferences are not commonly drawn and simple, fundamental elements of beauty are never discovered. But they are there and practice in the schools will bring them out and turn them into useful media of happiness.

Observation and analysis have shown that certain color schemes are most highly effective. Black is said to be the most suitable color for persons of red hair. Such persons may also wear very dark blue, blue-gray, or brown. For gray hair, the best colors are black, mauve, gray, and silvery green. Stout women look

larger in white and smaller in black, dark blue, dark green, and dark brown. Black or dark collars accentuate the slimness of tall, thin people.[1]

Yellow, red, and orange tend to advance, and therefore have the effect of enlarging the form. Blue, green, and violet tend to recede, and therefore have the effect of diminishing the form. Shiny texture tends to increase the girth. Blue garments emphasize the yellow in the face and therefore tend to bring out the sallowness in pale persons. Green, on the other hand, will bring out the pink in the face. Persons with light golden blond hair look best in blue-green and violet because these colors set off the warm yellow in the hair. Red sets off black hair, and green-black and blue-green set off red hair.[2]

Artificial light changes the effect of colors, and since most shops are now illuminated by electricity it is important to know the change in color due to artificial light. Purples and violets appear brown; yellow, orange, and red are brightened and enriched; green appears yellower and darker; and blue is less pure and darker.[3]

With respect to suitability of dress to age, occasion, and season, neither the school nor any institution can lay down canons of taste. It can, however, by practice in criticism of models and of clothes worn by children, cultivate discrimination in suiting the garment to the individual. Similarly, line and form in garments cannot be reduced to rules, but a critical attitude may be developed which will help each person to choose independently that design which expresses his personality most effectively.

Objectives Concerned with the Qualitative Standards of Clothing

To regard durability as a primary factor in clothing consumption.
To buy clothes that are expected to last longer than a single season.
To know that the strength of the fabric depends upon the ply of the yarn, the length of the fiber, the weave of the fabric, the closeness of the weave, and the presence of weighting or sizing material.

[1] Thompson, E. B. — *Silk Department*, Chapter XI.
[2] Weinberg, Louis — *Color in Everyday Life*, Chapter V.
[3] Thompson, E. B. — *Cotton and Linen.*

To have practice in judging durability as based on these factors.
To purchase raincoats, rubbers, gloves, and underwear with special emphasis on their hygienic value.
To know the relative capacity of the chief clothing fabrics to withstand the cold.
To know the effect of the number of layers of clothing on warmth.
To know the effect of red goods on warmth.
To know the effect of color on warmth.
To know the effect of absorption and evaporation on health and comfort.
To know the relative capacity of the chief clothing fabrics to absorb and evaporate moisture.
To know the relation of free movement of the body to clothing selection.
To know the relation between clothing selection and the weight of garments.
To select special garments to wear for rain, snow, cold weather, hot weather, damp weather, and windy weather.
To form habits of change of underwear, handkerchiefs, towels, stockings, etc., which meet the best hygienic requirements.
To know how to launder wool, silk, cotton, and linen.
To know the effects of laundering on comfort and cleanliness.
To have abundant practice in exercising taste with respect to color combinations and designs in clothing.
To know the color schemes which observation and analysis have shown to be most highly effective.
To know the effect of color on the form and line of clothes.
To know the effect of artificial light on the color of fabrics and to practice the use of this knowledge in clothing purchases.

The Consumption of the Chief Clothing Fabrics

The consumer is interested in garments primarily and the organization of the clothing studies should have the garment as a unit. However, there are certain facts which apply generally to each of the textile groups, which need to be cleared up first. Concerning each of the textile groups we shall discover: (1) the characteristics of the fiber, yarn, and fabric as they affect quality, (2) the grades of materials which enter into the manufacture of the fabrics, (3) the practices of substitution, adulteration, and imitation connected with each of the fabrics and the

simple tests for their discovery, (4) the misbranding of fabrics, (5) the variety of products of the fabrics and their trade names, (6) the grades of fabrics, (7) the forms and units in which fabrics are sold, (8) the distinctive functions of the several fabrics, (9) the laundering properties of the fabrics.

The relative importance of the chief textile fibers is given in the following tables showing the value of textile goods produced and the weight of raw materials used in 1919. This suggests the consumption habits of the people indirectly only. In order of monetary importance the textiles rank as follows: cotton goods, woolen goods, silk goods, linen goods. The raw materials, by weight, rank as follows: cotton, wool, silk, and flax.

TABLE XCII

RAW MATERIALS USED IN TEXTILE INDUSTRIES, 1919[1]

FIBER	POUNDS
Cotton	2,679,934,778
Wool	510,008,799
Animal hair and fiber	44,821,941
Silk	25,021,945
Flax	26,455,737
Hemp, jute, etc.	751,129,659

TABLE XCIII

PRODUCTS OF TEXTILE INDUSTRIES, 1919[1]

PRODUCT	VALUE
Cotton goods	$2,125,447,000
Cotton small wares	40,724,000
Cotton lace	29,397,000
Woolens and worsteds	1,053,040,000
Silk	688,946,000
Felt goods	39,230,000
Cordage, twine, linen goods	176,690,000

[1] United States Bureau of the Census, Volume on Manufactures, 1919.

In connection with each fabric we shall discuss specifically the practice of misbranding goods and the specific precautions to take, but since this practice will be a subject for legislation for some time it is necessary for the consumer to exercise an intelligent influence on law makers in this matter. There are at present bills before Congress and several state legislatures whose unselfishness is doubtful. The influence of the people should be in support of such a misbranding bill as is designed to help the consumer to evaluate hygienic condition, durability, effect of moisture, and the effect of laundering. It must be acknowledged, however, that the gross ignorance of fundamental clothing knowledge renders the most progressive misbranding bill only slightly valuable at this time. Clothing education should precede and perhaps supersede a misbranding bill.

I. COTTON AS A CLOTHING FABRIC

We have seen that cotton is decidedly the most important of the textile fabrics. It is made into handkerchiefs, men's shirts, dresses, waists, men's and women's underwear, shirt collars and cuffs, corsets, hosiery, gloves, towels, blankets, sheets, and pillow cases. The chief materials of cotton manufacture are: sheeting; print cloth, including percales, organdies, and dimities; lawns, nainsooks, and cambrics; ginghams; shirtings; drills; cotton flannel; and denim. The percales are usually made into dresses, aprons, and shirts. The lawns are commonly made into dresses and aprons. Cambrics are used for linings and underwear. Ginghams are made into dresses, aprons, and shirts.

Cotton is treated with glycerin for softness; with starch for fullness of finish, as in muslin; with mucilage and gum for gloss and stiffness, as in percale lining; with china clay for solid appearance, as in cretonne and canvas. Since this dressing breaks down in laundering it is important to be able to recognize it when making a purchase.

When cotton yarn is subjected to the treatment of caustic soda dissolved in water a product results which is generally known as

mercerized cotton. This process increases the strength of the fiber, gives it a silky finish, and increases its affinity for certain dyes and mordants. Because of its value it ought to become generally recognized.

The lisle finish on cotton goods is produced by removing the projecting ends. The genuine lisle finish is obtained by using the best grade combed cotton yarns. These are specially selected long fibers which are laid parallel, thus increasing the smoothness and tensile strength of the yarn. From 12% to 15% of the total quantity of raw cotton is used in the manufacture of combed yarns. These yarns are made into fine thread, laces, fine woven fabrics, fine hosiery, and fine knit goods. The cotton yarns are produced in a wide range of sizes weighing from one pound to the hank of 840 yards to one-four-hundredth of a pound. The number of hanks required to make a pound is used to designate the size or count of the yarn.[1]

Objectives Concerned with Cotton Goods

To know the chief articles of wearing apparel made of cotton.
To know the chief fabrics made of cotton.
To know and identify the chief articles of wearing apparel made of sheetings, percales, organdies, dimities, lawns, nainsooks, cambrics, and ginghams.
To know the comparative value and cost of these fabrics.
To identify cotton treated with glycerin, starch, mucilage, gum, or china clay.
To identify and know the value of mercerized cotton.
To identify and know the value of cotton having a lisle finish.
To know the special merits of combed cotton yarns.
To know the basis of the size of the cotton yarn or thread.

[1] This section is based on the following sources:
United States Federal Trade Commission; *Combed Cotton Yarns*, April 14, 1921.
Thompson, E. B. — *Cotton and Linen.*
Titsworth, E. B. — *Hints on Choosing Textiles;* Cornell Reading Courses, II, No. 45.
United States Bureau of the Census; *Manufactures; Cotton Goods.*

II. THE USE OF WOOL IN CLOTHING

Wool ranks second as a raw material of clothing. It is light in weight in proportion to other textile fibers. It absorbs moisture rapidly and gives it off slowly. It is durable and takes colors readily.

Nearly 70% of the raw material in wool manufacture is from the backs of the sheep, washed and cleaned. When used in connection with other fibers in wool manufacture it is called scoured wool. There are eight grades[1] of this wool depending upon the diameter and length of the fiber. Of course the consumer of clothing is not expected to identify these grades, but the fact that they exist indicates that at some point the consumer must exercise intelligent choice.

In addition to the scoured wool, 13.5% of all the fibers used was recovered wool fiber; 12.6% was animal hair and furs; and 5.3% was cotton. These figures[2] are very significant because they show how little intelligence is used in the common charges that are made by our people against woolen clothing. As far as the great bulk of woolen clothing in this country is concerned, there can be no large-scale adulteration. The variation in value depends upon the quality of wool in the various stages of manufacture and the skill used in producing the garment.

We learn that 13.5% of the raw material used in wool manufacture is reworked wool. This is sometimes referred to as shoddy and in contrast with it new wool is referred to as virgin wool. Both these terms as they are now used by unscrupulous manufacturers and merchants are misleading because they give no real indication of the final quality of the garment to be worn by the consumer. Indeed, this is at present the subject of legislation before Congress. Samples were submitted at hearings[3] held in June, 1921, which showed that the replacement of reworked wool by virgin wool would increase the cost of a fabric about 135%

[1] United States Tariff Commission; *Wool Growing Industry*, 214; 1921.
[2] Bulletin of the National Association of Wool Manufacturers, October, 1922.
[3] United States Senate Committee on Interstate Commerce; *Hearings on Truth in Fabric Bill*, July 7, 1921, page 365.

without increasing its wearing properties. The value of a woolen fabric is not only dependent upon the presence of shoddy but also upon the quality of the stock and the skill employed in making the cloth. There are certain cloths, such as cheviots, tweeds, cassimeres, chinchillas, and other rough-finished wools, in which reworked wool can be used advantageously. It should be remembered, too, that there are seven kinds of reworked wool of varying degrees of quality.[1]

The intermediate products of wool manufacture are given in the following table. Again it is seen that cotton-mixed woolens are a small portion of the total output of woolen goods. When cotton is used it forms the warp of the fabric. It is seen further that the woolen industry produces two principal kinds of goods which should be generally distinguished.

TABLE XCIV

WOOLEN AND WORSTED GOODS, 1919[2]

	VALUE	QUANTITY (Square Yards)
All-woolen suitings, dress goods, overcoatings, and cloakings	$241,988,000	140,338,000
All-wool worsted suitings, dress goods, and cloakings	301,850,000	166,791,000
Cotton-mixed worsted suitings, dress goods, and cloakings	32,297,000	28,576,000
Cotton warp woolen	34,992,000	39,063,000
Cotton warp worsted	45,707,000	58,154,000
Flannels for underwear, all-wool	1,906,000	1,755,000
Flannels for underwear, cotton-mixed	5,219,000	6,508,000
Domett flannels and shirtings	11,162,000	19,942,000

The short wool fibers are made into woolen yarn. The long wool fibers are made into worsted yarn, thus giving it greater tensile strength and making it more durable. The fibers of worsted are combed to lie in consistent parallel form, making a smooth woven fabric and one which keeps its fitted shape well.

[1] BEAUMONT, ROBERT — *Wool Substitutes*, 22.
[2] United States Bureau of the Census, Volume on *Manufactures;* 1919.

The difference between woolen and worsted goods is indicated by the following table,[1] which shows that most of the wool waste, short fibers or noils, recovered wool fiber, and cotton are used in the manufacture of woolen goods. The worsted goods, on the other hand, are comparatively free from reworked wool and cotton.

TABLE XCV

RELATIVE QUALITY OF WOOLEN AND WORSTED GOODS AS SHOWN BY THE FIBERS USED IN THEIR MANUFACTURE

FIBER	PER CENT OF TOTAL USE IN	
	WOOLEN-GOODS INDUSTRY	WORSTED-GOODS INDUSTRY
Scoured wool	50.2	49.8
Wool waste and noils	32.8	67.2
Recovered wool fiber	92.1	7.9
Animal hair	44.6	55.4
Mohair, camel, alpaca, and vicuña noils	90.8	9.2
Cotton	84.2	15.8

We have seen the relation of cotton and reworked wool to the quality of wool. We have also seen that woolen and worsted fabrics differ in quality. The presence of cotton cheapens the quality of the cloth. The presence of reworked wool may or may not have a similar effect depending upon its quality and treatment. The wool fibers themselves will affect the strength of a fabric depending upon their length and strength. The strength of the fabric too will depend upon the number of threads to the square inch. The threads themselves may be single- or two-ply. A wool manufacturer reporting to the Senate Committee on Interstate Commerce on the Truth in Fabric bill stated that he sold cloth which looked exactly like a second product. He charged twenty-five cents more per yard for the latter. The more expensive sample was two-ply in the warp and weft while the less expensive sample was two-ply in the warp and one-ply in the weft.[2]

[1] Bulletin of the National Association of Wool Manufacturers; October, 1922, page 437.
[2] United States Senate Committee on Interstate Commerce; *Hearings on Truth in Fabric Bill*, 204.

We have seen that only a small part of our population can afford high-grade goods. The great bulk of the clothing in everyday service is made from the medium- and low-grade cloth containing the less expensive stock.[1]

Such adulteration of wool which does occur falls heaviest on the lowest group of wage-earners who are in greatest need of durable clothing. There is a Peruvian cotton which feels and looks like wool which is mixed with the wool fibers and is sold as an all-wool material.[2] The process of making a nap on cloth has been so well developed that a fabric entirely of cotton may be made to resemble wool or given what is known as a wool finish.[3]

It is extremely difficult for the average consumer to evaluate a woolen garment. For example, a fabric for men's summer suits was made of wool, shoddy, and cotton blended, then corded and spun into yarns. There was no outward evidence of cheapness of the goods, which were sold as fancy cassimeres.[4]

The common fabrics produced in wool manufactures are albatross, blankets, broadcloth, cheviot, flannel, homespun, and serge. Albatross has a soft, loose weave and is made into dresses. Broadcloth is closely woven with a smooth, glossy surface and is made into suits and dresses. Cheviot has a nap and is made into suits. Homespun is a rough, loose material which is made into suits and dresses. Serge is a closely woven worsted which is made into suits and dresses.[5]

The tariff laws pertaining to wool have a direct relation to the quality and price of woolen clothing. It is important for the people of our nation to understand this relation in order to vote intelligently on the tariff issue and in order to know what changes in purchasing habits are necessary as a result of the enactment of low or high tariff on wool.

[1] *Textile World*, September 4, 1920, LVIII, 1559.
[2] Field, C. C. — *Retail Buying*, 68; 1917.
[3] Tariff Information Surveys; *Household Articles of Cotton*, 8.
[4] *Textile World*, January 12, 1918, LIII, 3101.
[5] Titsworth, E. B. — *Hints on Choosing Textiles;* Cornell Reading Courses, II, No. 45.

Objectives Concerned with the Use of Wool in Clothing

To know the special function of wool as clothing.
To know the chief raw materials which enter into wool garments and their effect upon the quality of clothing.
To understand the meaning of reworked wool and the effect of its use in clothing.
To know the meaning of virgin wool and to avoid being misled by its use as a general term.
To know the cloths in which reworked wool usually appears.
To recognize, when possible, the presence of cotton in a wool garment and to know its effect upon the quality.
To know the difference between woolen and worsted goods and their relative merits.
To identify alpaca and mohair goods.
To know the factors which determine the quality of woolen goods and to identify these factors in the finished cloth when possible.
To have a stock of fundamental facts to use in questioning sales clerks as to the value of woolen goods.
To purchase clothing of better and more durable quality.
To identify cotton when it is sold as wool.
To know the common wool fabrics, such as albatross, broadcloth, cheviot, homespun, and serge, and their special uses.
To know the effect of the tariff laws on the quality and price of wool.

III. SILK IN CLOTHING

Silk is used in the manufacture of dresses, waists, women's underwear, men's shirts, men's neckties, handkerchiefs, ribbons, hosiery, gloves, and sweaters. Twice as much silk was consumed in 1920 as in 1911.[1] This increase has been partly due to the popular favor of sport clothes, of which silk knit goods and sweaters are an item. Its luster, strength, softness, elasticity, and affinity for dyes make silk a superior fabric. In spite of its relatively high cost it is consumed by low wage-earners and their families, particularly in the large cities. Since they cannot afford to pay for good silk they buy artificial silk; mixtures of silk and cotton;

[1] United States Tariff Commission, Tariff Information Series, 1922; *Silk Wearing Apparel*, 43 f.

the coarser silks, such as tussah; spun silk; weighted silk; surfaced silk; and artificially finished silk. These varieties of adulterations and imitations will be discussed later.

There are two general classes of genuine silk yarns. The raw or reeled silk, consisting of the long fibers, is made into thrown-silk yarns. The waste silk or broken fibers are made into spun-silk yarns. These yarns are made into the cheaper garments. Spun silk is used in the pile or the base of silk velvets. It is also used to give fullness and body to broad silks, such as Liberty Satin and Taffetaline shirtings.[1]

Because of its value silk has been imitated more than any other fiber. One of the chief imitations is artificial silk. It is made of cellulose, collodion, or gelatin. In 1921 approximately twenty million pounds of artificial silk[2] were produced as compared with an approximate production of forty-three million pounds of real silk for the same year.[3] Of the total output of artificial silk, 30% is used in making hosiery, 30% is used in making knit goods; and 40% is made into cloth.[4] Although the cost of production of artificial silk is about one-half that of silk much of the material sold by the yard is as expensive as silk.[5] Artificial silk stockings and sweaters are less expensive than those made of silk. The artificial silk stocking sometimes wears better than a cheap silk stocking. Artificial silk is found in ribbons but it is not satisfactory because its thread loses its smooth appearance in use. It is also used extensively in trimmings, braids, embroidery, flosses, hat ornaments, gloves. It is woven with natural silk and cotton into dress goods.

The artificial silk excels the natural silk in luster only. Water and hot irons injure artificial silk. Artificial silk may be recognized by burning, for it burns readily somewhat like a vegetable fiber and gives off no odor. It is stiffer, less elastic, and less strong than true silk.

[1] United States Tariff Commission, Tariff Information Surveys; *Silk, Silk Yarns and Threads, and Silk Pile Fabrics*, 1921.
[2] *Textile World*, February 4, 1922, page 661.
[3] United States Bureau of the Census, mimeographed report, February 19, 1923; *Silk Manufactures*.
[4] *Textile World*, February 4, 1922, page 661.
[5] THOMPSON, E. B. — *Silk Department*, 77.

Mercerized cotton is often sold as silk because of its luster. Sometimes mercerized cotton is added to silk to form an adulteration of silk. The adulterated product is then given a name which leads the consumer to believe that he is buying silk. Misleading names used are *near silk*, *silkaline*, *farmer's satin*, and *sateen*. Mercerized cotton is sometimes passed as real silk under the name of *pongee*, *tussah*, and *rajah*.

Imparting a silk surface to cotton yarn by soaking it in a solution of pure silk is another misleading practice when it is not sold as cotton. The surface has very little durability.

There are several methods of adulterating silk which should commonly be known. The value of silk depends, among other things, upon its weight. To increase the return on the sale of silk the practice of weighting it with mineral salts is employed. Thus a pound of raw silk is converted into as much as three pounds of silk cloth. The product is false and the true silk decreases in strength. Silk weighted with metallic salts when burned leaves an ash.

There are ways of making cloth which expose a silk surface on a cotton base. Satins are made which have a cotton back. Pile fabrics are made with a cotton base. Silk and cotton goods are woven so that the silk in the warp appears on the surface. In most cases mixed fabrics do not have the same luster as the pure silk. Cotton is used for the cords in corded fabrics such as Bengaline, poplin, reps, and moirés. When the silk surface threads are worn off the cotton cord is exposed. The common silk and cotton mixtures are voiles, shantungs, foulards, cotton-back satins, velveteens, silk muslins, silk ginghams, brocades.

The following products contain no silk and are sold under names which lead the purchaser to believe that they contain silk: *Kapok Sun Fast Silks*, *Maxwell Silk Poplin*, *Rubberized Raincoats*, *Lion Brand Sewing Silk*, *Esskay Unequaled Best Silk*, *Klostersilk*, *Subsilk*, *Sansilk*, *Silkateen*, *Japsilk*.[1] The consumer should guard against being misled by such products. He should use his influence to encourage correct labeling.

[1] Hearings of United States Senate Committee on Interstate Commerce.

Objectives Concerned with the Consumption of Silk in Clothing

To know in what garments silk is chiefly used and whether it is used appropriately in these garments.
To know the peculiar value of silk as the raw material of clothing.
To know what raw materials go into the less expensive silks and their relative merits.
To know the difference between thrown silk and spun silk.
To identify artificial silk.
To know its chief uses.
To know its chief limitations.
To know the comparative cost of real and artificial silk.
To distinguish between mercerized cotton and real silk.
To know the misleading names for fabrics made of mercerized cotton.
To know of the practice of exposing a silk surface on a cotton base.
To know and identify silks weighted with metal salts.
To guard against purchasing mixtures of cotton and silk for pure silk at the price of pure silk.
To guard against cotton mixtures in corded material.
To know the names of the fabrics in which mixtures are usually found.
To identify and know the fabrics which are sold under names which suggest that they are made of silk but which contain no silk.
To know the names of the chief fabrics made of silk.

IV. LINEN GOODS IN CLOTHING

√ Linen is the cleanest of all the fabrics. Dirt does not cling to it as much as it does to cotton and germs do not increase on it as rapidly. Linen launders more easily than cotton. It is stronger than cotton. It does not shrink when laundered. It is soft and absorbs moisture quickly, thus being especially suitable for use in handkerchiefs and towels. Laundering increases its brilliancy and freshness. Its chief defect is its inability to absorb and hold dyes. Its ability to shed dust readily makes linen suitable for tablecloths and for napkins. Its cool feel and its rapid absorption and evaporation of moisture make it suitable for summer dresses and suits.

In spite of its virtues linen is not consumed widely by the mass

of people because of its high cost. It is conceivable, however, that the use of some linen products would be economical in the long run. These products should become familiar to the people.

The raw material of linen fabrics is flax, which varies in quality with its source and treatment. Irish linen is white, reliable, and enduring. Scotch linen is silver white, lighter in weight than the Irish linen. It is produced in showy designs and is sold at moderate prices. French linen is exquisite in design and especially attractive. Belgian linen contains the finest fiber. German and Austrian linen is silver white and of high grade. Russian linen cracks. The English linens are the heavier qualities.

Cotton, mixed with linen or especially treated, is sold as linen. The reason for this is obvious. The price of linen is high and its virtues are universally known. Unscrupulous manufacturers and merchants combine to delude the consumer into believing that he is purchasing linen at a price just a little above the price of cotton. Mercerized cotton is sold as linen. Much fancy linen, when sold at lower prices for table linen and for dresser, is really a mixture of cotton and linen. Linen towels are made of *union goods* or mixtures of cotton and linen. "Irish linen" handkerchiefs often contain only 50% to 60% linen. Many cotton and union handkerchiefs are marked pure linen. Damasks and dress linens often contain large percentages of mercerized and calendered cotton.

The consumer should know how to make a simple test to discover whether a product is cotton or linen. A drop of oil on linen is transparent, on cotton it is opaque. Linen burns more slowly than cotton, and smolders. Cotton is warm and linen is cool and leathery. Cotton does not absorb moisture as rapidly as linen.

Starch, glue, and gum are used to give body, firmness, and gloss to the cheaper grades of linen. These wear off when the linen is washed. They may be detected by holding the fabric up to the light.

The common linen fabrics are crash, damask, handkerchief linen, cambric, linen lawn, toweling, sheeting, and huckabuck. Crash is used in toweling, dresses, and summer suitings. Damask is used in towels, tablecloths, and napkins. Handkerchief linen is used in handkerchiefs, children's dresses, and waists. Cambric is used in dress goods, lingerie, and handkerchiefs. Linen lawn is used in dresses, waists, lingerie, and handkerchiefs. Toweling and huckabuck are used in towels. Sheeting is used in bed sheets, dresses, and suits.

Some cotton materials which are sold under names designed to suggest that they are linen are: *French linen*, *Killarney linen*, *linene*, *near linen*, *flaxon*, and *linon*. The consumer should be familiar with these deceptive names.[1]

Objectives Concerned with the Use of Linen in Clothing

To know the special characteristics of linen as a clothing material.
To know the laundering properties of linen.
To know the effect of dyes on linen.
To know the uses for which linen is especially adaptable.
To know the characteristics of Irish, Scotch, Belgian, German, Austrian, Russian, and English linens, and their effect on quality and price.
To guard against buying adulterated linen as pure linen or at the price of pure linen.
To distinguish mercerized cotton from linen.
To guard against buying union towels, tablecloths, handkerchiefs and dress goods for pure linen.
To test for the presence of cotton in linen goods.
To distinguish cotton from linen by making a simple test.
To recognize linen that is sized or finished with starch, glue, or gum.
To know the common linen fabrics and their appropriate uses.
To know the misleading names under which substitutes for linen are sold and to purchase them only for their true worth.

[1] The general information in this section was obtained from the following sources:
THOMPSON, E. B. — *Cotton and Linen.*
TURNER, ANNABELLE — *Study of Fabrics.*
NYSTROM, PAUL — *Textiles*, Chapter IX.

To use textile knowledge in removing fraudulent practices in the manufacture and sale of linen.

The Use of Fur in Clothing

For the great mass of people fur is a luxury, yet the amount of money spent for furs in 1919 is nearly the same as the amount of money spent for underwear. It is therefore necessary to give furs a little attention in the schools. Certain fundamental facts ought to be known because so much deception is practiced in the manufacture and sale of furs. What particular furs are of most general use are suggested by some fur merchants of St. Paul, who filed a brief [1] with the Senate Committee on Finance, giving the following classification as to whether furs are luxuries:

Furs as articles of luxury — Russian sable, marten, ermine, mole, lynx, black fox, silver fox, sea otter, fisher, fur seal, blue fox, white fox, chinchilla, polar bear, and grizzly bear.

Furs not made into articles of luxury but used by people of small means — marmot, hare and rabbit, wolf, raccoon, red fox, kitt fox, pony, house cat, wild cat, opossum, muskrat, Japanese mink, Chinese weasel, kangaroo, dog, goat, sheep and lamb, hair seal, wool seal, wombat, and wallaby.

The chief skins which enter into the furs used by the American people are indicated in the following table. The muskrat, skunk, opossum, and raccoon are most numerous. The relative cost of these furs is illustrated in a second column which gives the relative cost of pelts in 1918. Thus we find that the inexpensive furs which are produced in abundance are the muskrat, opossum, ermine, and hare. It is these furs which should interest us especially. The relative durability of these furs is given in the third column. Of the inexpensive furs, the muskrat is the most durable and is followed by the opossum, ermine, and hare, the latter having little durability. We shall soon see that these inexpensive furs masquerade in the retail market as sables, foxes, minks, seals, beavers, and chinchillas.

[1] *Tariff Hearings*, Committee on Finance, United States Senate, 63d Congress, 1st Session, III, 1590.

TABLE XCVI

ESTIMATE OF AVERAGE ANNUAL PRODUCTION OF SOME FURS IN NORTH AMERICA AND THEIR RELATIVE COST

KIND OF FUR	SKINS	PRICE PER PELT[1]	DURABILITY[2] (Otter=100)
Muskrat	8,000,000	$1.30	45
Skunk	1,500,000	4.75	70
Opossum	1,000,000	1.10	37
Raccoon	600,000	3.50	65
Ermine	400,000	1.18	25
Hare	200,000	.34	5
Red fox	200,000		
Marten	120,000	21.00	35
Civet cat (small skunk)	100,000		40
Beaver	80,000	16.60	90
Lynx	90,000	26.75	25
House cat	80,000		
Mink	60,000	4.00	35

We have seen that the only furs, if any, which the mass of people consume are limited to a small group of skins which in the retail market are practically unknown. This is because furs are clipped, dyed, and pulled in such a way as to resemble those which are superior in wearing quality and in warmth. The pelts of animals from warmer zones, such as the woodchuck and the opossum, are sold under names of animals in the colder climates. Such furs are inferior in suppleness and durability of leather, denseness and silkiness of underhair, fullness of protective hair, and, because dyed, are brittle and less durable in general. Furs commonly altered and sold under names of superior kind are:[3]

SPECIES:	ALTERED AND SOLD AS:
Hare, dyed	Sable or fox
Marmot (woodchuck) dyed	Mink, sable, skunk
Mink, dyed	Sable
Muskrat, dyed	Mink, sable

[1] United States Tariff Commission, Tariff Information Surveys; *Furs and Fur Goods*, 38 and 39.

[2] LAUT, A. E. — *The Fur Trade of America*, 34.

[3] HAUSMAN, LEON — "Microscopic Identification of Commercial Fur Hairs"; *Scientific Monthly*, January, 1920, X, 70–78.

Species:	Altered and Sold as:
Muskrat, pulled and dyed	Seal, electric seal, Hudson Bay seal, Red River seal
Opossum, sheared and dyed	Beaver
Rabbit, dyed	Sable
Rabbit, sheared and dyed	Seal, electric seal, Hudson Bay seal
Rabbit, white	Ermine
Rabbit, white, dyed	Chinchilla
Hare, white	Fox

Objectives Concerned with the Use of Fur in Clothing

To distinguish the expensive group of furs from the inexpensive group.
To know and identify the chief skins consumed by the American people.
To know the relative cost of these skins.
To know the relative durability of these skins.
To know the names under which the inexpensive furs are commonly sold.

Rubberized Fabrics in Clothing

From the viewpoint of the comparative value of products consumed, rubberized fabrics are a negligible factor in clothing. As footwear, rubber goods are of some importance but will be discussed later. The consumer has occasion to purchase and use rubberized fabrics in the form of raincoats, chiefly. The raincoat is durable and keeps out the rain. Rubberized cloth does not stand sunshine, heat, or oil.

There are three varieties of raincoats. There are single-texture fabrics, containing one layer of fabric and one layer of rubber on the inside. There are double-texture fabrics, containing two layers of fabric held together by a layer of rubber between them. There are fabrics that have a layer of rubber on the outside.[1]

All rubber products are built on a foundation of cloth. Experience has shown that cotton is best adapted to the process which rubber goods must undergo. Raincoats, however, are made of silk, bombazine, cashmeres, twills, tweeds, plaids, and rep. Silk is used for ladies' raincoats and wool for men's raincoats. Army raincoats are made of cotton bombazine. High-grade

[1] Geer, W. C. — *The Reign of Rubber*, 183; 1922.

raincoats are made of double-texture fabric, the back resembling a plaid lining and the face resembling a spring worsted coat.[1]

Objectives Concerned with Rubberized Fabrics in Clothing

To know that sunshine, heat, and oil attack rubber fabrics.
To know the three kinds of raincoats and their relative value.
To know the chief textile materials used as a base for rubberized cloth and their relative quality and cost.

[1] DANNERTH, FREDERICK — "The Manufacture of Rubberized and Rubber Coated Fabrics"; *Color Trade Journal*, VIII, 234, January, 1921.

CHAPTER IX

CONSUMPTION OF CLOTHING (*Continued*)

Women's Clothing

It has not been possible to get adequate data upon which to base specific and reliable recommendations concerning women's clothing, because of the lack of statistics dealing explicitly with women's clothing. It is a question whether statistics, if they could be obtained, would have any permanent worth because of the changing effect of styles of women's suits, coats, skirts, waists, and dresses. However, what data were available will be presented here.

There were no comprehensive figures showing what materials enter into the suits, coats, skirts, waists, and dresses of women. The figures of several special studies, only, will be presented. E. L. Phelps[1] collected information concerning the materials which entered into the service dresses actually worn by 876 teachers, students, clerks, and homemakers. In interpreting the data from this study it should be remembered that they represent a group above the average American economic level. Of them, 91% reported the use of wool and 61% reported the use of silk. Of all the wool dresses, 55% were made of serge and 21% were made of tricotine and jersey. Of all the silk dresses, 50% were made of taffeta and satin. Poplin, broadcloth, gabardine, and velours were used to a moderate degree. Of about sixty materials only six were used for nine-tenths of the wool or silk service dresses.

The quantity and quality of women's clothing consumed by over twelve thousand families in 92 representative localities are given in the following table. The standard quality and quantity are given in columns to the right of the actual figures.[2] The comparison shows that in every case the clothing of the average woman

[1] "A Study of Clothing Purchasing Habits"; *Journal of Home Economics*, November, 1920, page 491.

[2] United States Bureau of Labor Statistics; *Monthly Labor Review*, September, 1922, page 49 f.

studied is much below the standard quality of decency as expressed in money value. In quantity, the women of the families studied buy more suits than they require. On the other hand, they buy too few waists, dresses, and skirts. The suits bought by the women are made of wool twice as often as they are of cotton. Dresses are chiefly made of cotton, and silk dresses are used twice as often as wool dresses. Skirts are made of cotton, wool, and silk in the ratio of 3, to 2, to 1. Cotton waists are worn more than twice as frequently as silk waists.[1]

TABLE XCVII

CONSUMPTION OF WOMEN'S CLOTHES COMPARED WITH STANDARD
(Prices of fall of 1919)

ARTICLE	QUALITY		QUANTITY	
	ACTUAL COST PER ARTICLE	STANDARD COST PER ARTICLE	ACTUAL NUMBER OF ARTICLES PER YEAR	STANDARD NUMBER OF ARTICLES PER YEAR
Suits, wool	$24.97	$53.00	.7	.5
Suits, cotton			.3	
Coats	23.61	50.00	.3	.3
Dresses, cotton	3.51	5.00	.5	2.0
" wool	13.57	25.00	.1	.5
" silk	14.29		.2	
Skirts, cotton	2.73	5.00	.3	.5
" wool	6.29		.2	
" silk	6.29		.1	
Waists, cotton	1.58	2.50	1.2	3.0
" silk	4.29		.5	
" wool	3.36		.01	

The common materials which enter into women's suits are broadcloth, cheviot, gabardine, homespun, serge, tweed, and linen. The common materials which enter into women's coats are broadcloth, melton, kersey, chinchilla, cheviot, worsted, and woolen. The common materials which enter into women's waists are batiste, dimity, canton crêpe, lawn, madras, soisette, and voile.

[1] Bureau of Applied Economics; *Standards of Living*, 33–36.

Consumers should be able to identify these materials and to know roughly their comparative value and cost.

Objectives Concerned with Women's Clothing

To know the effect of styles on women's clothing.
To identify the common materials of which suits, coats, skirts, waists, and dresses are made.
To know the relative value of these materials.
To know the relative cost of these materials.
To buy clothing of better quality.
To order the budget so as to make possible the purchase of more durable garments.
To purchase an adequate quantity of dresses and skirts for decent living.
To know in general the cost and durability of standard garments.
To know the relative advantages of cotton, silk, wool, and linen in skirts, suits, coats, and dresses.

The Consumption of Men's Clothing

A comparison between the suits and coats consumed by the average man in 12,000 representative American families and those of the standard of the United States Bureau of Labor Statistics is given in the following table. It shows that the average man buys a new suit every twenty months instead of buying one every year. He does not spend enough for suits and coats to get that quality which is set down in the standard.

Table XCVIII

CONSUMPTION OF MEN'S CLOTHING COMPARED WITH STANDARD
(Prices of the fall of 1919)

Article	Quality		Quantity	
	Actual cost per article in dollars	Standard cost per article in dollars	Actual number of articles per year	Standard number of articles per year
Suits	26.54	40.00	.6	1.0
Trousers, wool	5.08		.4	
" cotton	3.06		.4	
Overcoats	22.38	40.00	.2	.25

The Bureau of Business Research of the Northwestern University School of Commerce made an analysis of the retail distribution of clothing which throws light on the quality of men's clothing consumed from a different viewpoint. In this study [1] the university had the coöperation of the National Association of Retail Clothiers. The analysis is based upon returns from 415 stores in 1919; 387 stores in 1918; and 287 stores in 1914. The stores were located in 36 states in the Union and 76% were in cities of less than 40,000 population in 1920. The average suit sold in 1919 cost $37.17, and the most common suit cost from $30 to $40. The quality of 162,674 suits sold by 128 stores in 1919 is given in the following table. The average suit sold in these stores is considerably higher than the average suit purchased by the 12,000 families studied by the United States Bureau of Labor Statistics. However, the table below shows that at least 50% of the suits sold by the stores studied were inferior to the standard recommended by the United States Bureau of Labor Statistics.

TABLE XCIX

QUALITY OF SUITS SOLD BY 128 STORES IN 1919

DOLLARS	QUANTITY	PER CENT
Under 20	16,516	10.1
20 to 30	32,977	20.3
30 to 40	48,996	30.1
40 to 50	39,307	24.2
50 to 60	17,335	10.6
60 to 80	7,117	4.4
80 and over	427	.3

In 1916 the United States Bureau of Foreign and Domestic Commerce listed the representative fabrics that constituted the bulk of the sales of the year as reported by 48 establishments

[1] Northwestern University School of Commerce, Bureau of Business Research; *Costs, Merchandising Practices, Advertising, and Sales in the Retail Distribution of Clothing*, I, 38.

making men's clothing.[1] Worsted, cashmere, cheviot, and serge were most frequently mentioned as representative fabrics.

The fabrics generally used by the men's clothing trade for overcoats are beaver cloth, chinchilla, melton, and kersey. For suits the usual fabrics are broadcloth, cashmere, cheviot, homespun, serge, tweed, and worsted, the latter being the most frequently used.

Most of the clothing manufacturers and retailers emphasize style, cut, and shade of cloth. Great care is taken to select novelty fabrics, but practically no attention is given to the quality of the cloth. Manufacturers are concerned with the ability of the design to sell quickly. The manufacturing cost due to changing styles and fabrics is so great that cheap fabrics are used even in high-priced suits.[2]

This emphasis on style in men's clothing introduces a new element into the economics of clothing which should be considered by educators in order to determine whether they shall consent by their active or passive influence to develop the same conditions as prevail with respect to women's clothing. An old firm said that whereas formerly its line of overcoats was limited to 2 styles it was selling 19 styles in 1916.

Objectives Concerned with Men's Clothing

To buy an adequate supply of suits.
To buy suits of better quality.
To know the staple fabrics which enter into suits and overcoats for men and boys.
To know the relative value and cost of these fabrics.
To know the effect of style on men's clothing.

The Consumption of Shoes

The expenditure for shoes is nearly as great as that for men's and boys' clothing and women's and girls' clothing. Popular ignorance of quality, cost, and hygiene of shoes results in a tremendous waste of money and a huge amount of discomfort and suffering.

[1] United States Bureau of Foreign and Domestic Commerce, Miscellaneous Series No. 34: *The Men's Factory-Made Clothing Industry*, 110 f.; 1916.
[2] *Ibid.*, 149 f.

In order to talk intelligently to the retail shoe salesman the consumer should be familiar with the technical names for the various parts of the shoe. Each of these parts affects the quality, comfort, and cost of the shoe. The function of each part and the extent to which it affects the value of the shoe should be known. The principal parts of the shoe are the upper, sole, welt, inner sole, vamp, top, tip, backstay, and tongue.

The upper is of first importance to the consumer. The kinds of leather which go into the uppers of American shoes are indicated in the following table showing the products of the bulk of total manufacture in the United States.[1] Cowhide ranks first, kid and goat skin rank second, calf skin ranks third, and sheep and lamb skin rank last.

TABLE C

SHOE-LEATHER PRODUCTION, 1919
(Based on Returns of 319 Companies)

SHOE LEATHER	PAIRS
Side upper (cowhide)	397,707,802
Kid and goat	268,184,088
Calf and kid	153,489,332
Sheep and lamb	97,843,006

The preceding table shows that only four or five kinds of leather are used in making uppers. It ought, then, to be easy for the consumer to learn to distinguish these few varieties of leather and to learn their relative merits and their comparative prices. Cowhide is split into two or more layers and is treated for use in uppers. A certain amount of side leather, as cowhide is called by the trade, enters into medium- and high-grade shoes when especially well treated, but the most part of side leather is used for the cheaper dress shoes and work shoes. Side leather is sometimes dressed with oil, is given a calf grain, and is sold as satin calf.

[1] United States Federal Trade Commission: *Report on Shoe and Leather Costs and Prices*, 48, June 10, 1921.

Kid skin is light, soft, and pliable. It stretches more than any other upper leather. It polishes well, and its strength is fair. The pores of good kid are not visible. Good calf skin is durable, strong, resists water, is pliable, has a good grain, and takes a high polish. It makes a practical everyday shoe. Sheepskin is light and fine in texture but it is not durable. Cordovan is made of horsehide. It is firm, solid, durable, takes a high polish, but lacks the pliability of other leathers. Kangaroo is a rare leather but is most satisfactory for shoes.

The finish of upper leather, that is, the coloring, surfacing, or graining, is important to the consumer because it enters into the name of the shoe. To order a shoe by its finish only, such as vici, is to ignore the other qualities of a good shoe. However, the finer finishes are usually associated with the finer shoes. The principal finishes of kid are glazed, mat, patent, and French. Glazed kid has a glossy finish; mat kid has a dull finish; patent kid has an enamel finish; and French kid has a fine-grained surface. Vici kid is a trade name. The principal calf finishes are wax, mat, velours, box, Russian, and patent. Wax calf has a dull finish; mat calf has a dull but not waxy finish; velours calf has a glossy finish; box calf has a grained finish; Russian calf is a superior quality colored finish obtained by treatment with birch oil; patent calf has an enamel finish. Calfskin is sometimes grained to resemble kangaroo. Suede finish is a soft napped surface produced on kid, calf, or cowhide.

The soles of shoes are generally made of cowhide. The soles are classified according to the tanning to which they are subjected. The following table shows the chief kinds of soles which were produced in the United States in 1919. A second column gives their relative quality in terms of cost. Oak-tanned sole leather is used most frequently, followed by union, which is a combination of oak and hemlock. Hemlock-tanned soles are used in the lower-grade shoes. Real oak leather is tanned by the use of oak bark. It is scarce and is now used only on very high-grade shoes. Any light-colored sole leather is now called oak leather.[1]

[1] Dyer, Elizabeth — *Merchandise Manual for Shoe Departments*, 18; 1921.

TABLE CI

CHIEF SOLE LEATHERS PRODUCED IN THE UNITED STATES IN 1919

KINDS	SIDES PRODUCED[1]	WHOLESALE COST PER POUND[2] (In Cents)
Oak	10,086,228	49.1
Union	7,314,834	45.0
Hemlock	1,731,545	41.9

In general the consumer should be able to recognize a shoe of good quality by the leather and finish of the upper; the fine and regular stitching; and the evenly trimmed edges. The welt is a narrow strip of leather which joins the upper to the sole. There are two types of welts, the Goodyear and the McKay. The Goodyear is considered the better and the more comfortable.

The amount of suffering caused by shoes which fit badly will never be recorded. An indication of how poorly the shoes of the mass of people are fitted is given in a report of a survey of enlisted men's feet made by the War Department, which showed that 81.77% of the men at one camp wore shoes from one-half to three and one-half sizes too short; that 3.07% wore shoes which were too long; and that 15.16% wore shoes of correct size.[3] A knowledge of the simple facts pertaining to the structure of the foot should help to make people understand the real function of shoes. A good fit should conform to the length and width of the foot, and the shank and heel should fit snugly.

Styles in shoes increase the cost of manufacture and distribution. When a leather comes into fashion its price rises. It requires 10% more leather to cut a style shoe than a staple shoe. The labor cost is doubled by the demands of style. The retailer adds to the selling cost because of the risk of being left with unsold stock. The economic loss due to shoe fashions was recognized by the War Industries Board when it limited the color and lasts to be

[1] United States Bureau of the Census; *Manufactures: The Leather Industry*, 1919.
[2] United States Federal Trade Commission; *Report on Shoe and Leather Costs*, 63; 1921.
[3] Office of the Adjutant General; *Document 879*, October 26, 1916.

introduced during the spring season of 1919.[1] The consumer, therefore, should become aware of the rôle of styles in taste and in cost of shoes.

The cost of manufacturing shoes increased greatly between 1914 and 1917 but not to such an extent as to warrant the prices at which manufacturers sold their product. The public paid prices for shoes that could not be justified because the retail shoe dealers took too much profit and because they passed on the excess profits on hides and leathers.[2] A body of intelligent consumers acquainted in a general way with the cost of manufacture could have prevented this unjustified rise in the price of shoes.

Objectives Concerned with the Consumption of Shoes

To know the place of shoes in the budget.
To know the technical names of the various parts of the shoe.
To know how each part affects the quality, cost, and comfort of the shoe.
To know the chief kinds of leather which go into the upper of a shoe; to know their relative merits and cost.
To identify the leather used in the upper of a shoe.
To know and to identify the chief finishes in which upper leathers are sold.
To distinguish between the name of the leather and the name of the finish.
To know the kinds of leather that go into soles and their relative quality.
To recognize the quality of a shoe by the stitching and the welt.
To fit a shoe properly.
To know the structure of the foot and the relation of the shoe to this structure.
To know the effect of high heels and tight shoes upon health.
To know the system used for recording the sizes and widths of shoes.
To be acquainted in a general way with the cost of manufacture of shoes.

The Consumption of Hosiery

Hosiery ranks immediately after shoes in value of clothing articles consumed by the American people. Obviously more care

[1] United States Federal Trade Commission; *Report on Shoe and Leather Costs and Prices*, 137 f.; June 10, 1921.
[2] United States Federal Trade Commission; *Report on Leather Industries*, 1; 1919.

should be given to the purchase and use of hosiery than persons commonly consider necessary. The principal materials which enter into hosiery are cotton, silk-mixed, silk, all-wool, wool-mixed, and artificial silk. The figures for this classification are given below.[1] The clothing survey already discussed is in agreement with the census figures concerning the general use of cotton in hosiery. Silk and wool have made considerable gains as hosiery materials in the last ten years.

TABLE CII

PRODUCTION OF HOSIERY, 1919

FIBER	PER CENT OF TOTAL PRODUCTION
Cotton, not mercerized	57.6
Silk mixed	16.9
Cotton, mercerized	14.1
Merino (wool mixed)	5.0
Silk	3.4
Artificial silk	1.9
Woolen	.8
Worsted	.3

Cotton hosiery comprised 72% of the total dozen pairs reported to the census bureau in 1919. Of this per cent 19.6% was mercerized cotton hosiery. Good cotton hosiery is made of mercerized cotton and lisle. The mercerized cotton hose is lustrous and takes colors well. Lisle is a smooth, glossy cotton thread, made by removing the projecting ends. The real lisle finish is obtained by using the best and longest cotton fibers, which yield a hard, wearing yarn.

In 1919, 22% of all the hosiery was made of silk, this per cent constituting 43% of the total value of hosiery. The total increase in the production of silk hosiery from 1914 to 1919 is 9,500,000 dozen pairs. The gross increase in production of hosiery consists chiefly of silk, cotton hosiery having decreased during the same period and wool hosiery having increased only

[1] United States Bureau of the Census; section on *Knit Goods*, 1919.

4%. The important consideration in this connection is that most of the silk in hosiery worn by the wage-earners must of necessity be of inferior quality. According to the report of the Bureau of the Census for 1919, of all the silk hosiery 17% was made of pure silk, 74% was made of silk mixed, and 9% was made of artificial silk. It should be remembered that low-grade silk is made in many forms and the purchaser must guard against them in hosiery because perspiration is especially injurious to artificial silk and silk weighted with metallic salts.

The terms used in hosiery marketing are not well known, yet they stand for very definite factors of quality. Cut hosiery is woven in a long tube and cut, the feet being sewed on afterward. Such hosiery does not conform to the curves of the leg. It is therefore necessary to stretch it and press it into shape. This is the cheapest kind in common use. The shape is lost after laundering. Woolen hosiery woven in tubes has no great disadvantage because it is usually ribbed and has great elasticity. The fashioned hose are made to hold their shape by varying the number of stitches to conform to the shape of the leg. Full-fashioned hose is knitted flat and shaped by controlling the number of stitches in the leg, heel, instep, and toe. It is finally stitched from toe to top, forming a seam. This is the best fitting and most expensive hose. To imitate this, hose knitted in the form of a tube is given a false seam down the back.[1]

Only 6% of all the hosiery made in 1919 was wool and of this four-fifths was wool-mixed.[2] Woolen, worsted, cashmere, and merino yarns are the chief materials used. Cashmeres are worsted yarns with a woolen finish and merino is a mixture of wool and cotton spun together in the yarn.

Objectives Concerned with the Consumption of Hosiery

To know the principal materials which enter into hosiery and their comparative value and cost.

To guard against buying wool-mixed and silk-mixed as the genuine articles.

[1] "A Hosiery Guide for the Shopper," *Journal of Home Economics*, XIII, 368, August, 1921.
[2] United States Tariff Commission, Tariff Information Surveys; *Wool Knit Goods*, 16; 1923.

To distinguish between real and artificial silk in hosiery.
To identify mercerized cotton hosiery and to know its merits.
To identify lisle hosiery and to know its merits.
To identify wool-mixed, all-wool, and cashmere hose.
To distinguish cut hose, fashioned hose, and full-fashioned hose.
To guard against false seams in tubular hose.

The Consumption of Hats

The census figures on the production of hats given below indicate that the chief material used in the manufacture of hats is fur-felt, which is used both in men's and in women's hats. Cloth hats and caps are consumed more widely than either straw hats or wool-felt hats. The wool-felt hat is a cheap substitute for the fur-felt hat. Women's hats, as appears from the table, are a large item in the clothing budget.

Table CIII

THE PRODUCTION OF HATS — FROM THE 1921 CENSUS REPORT

Product	Value
Millinery (and lace goods)	$268,714,000
Fur-felt hats	52,396,000
Cloth hats, caps, etc.	36,987,000
Straw hats	29,253,000
Wool-felt hats	4,964,000

The chief materials of women's hats for cold weather are Lyons velvet, hatter's plush, fur-felt, beaver, and velveteen. Taffeta, faille, crêpe de chine, georgette, and satin are used between seasons. Hat frames are made of crinoline, buckram, and rice net.

Hatter's fur is the most important material entering into the manufacture of fur-felt hats. It is made of the soft underfur of the rabbit, hare, coney, nutria, and beaver. Rabbit skins are used most extensively and beaver is only rarely used at present. Caps, wool-felt hats, and cloth hats are coming into greater use

because they can be produced at less cost than fur-felt hats. The cloth hat and cap are especially durable.

The principal materials used in the manufacture of straw hats in this country are braids and plaits of straw, grass, clip or wood shavings, and hemp. The majority of hats consumed in the United States are made by sewing the braids into the shape of hat bodies. The only other type of straw hat consumed in this country is the woven hat. The comparative value of sewn and woven straw hats is not easy to determine. Woven bodies can be cleaned easier. The better woven hats are higher in price than the sewn hats. Woven hats are serviceable in all kinds of weather, fit snugly, and shed rain. Sewn braid hats will not stand rain. Woven hats are generally lighter in weight.

The cheapest braid used in straw hats is wood shaving, which, when lacquered, resembles the more expensive straw. The chief kinds of woven hats are Panamas, Japanese Panamas, Philippine hats, and leghorn hats. The Panama is made from palm leaves; the Japanese Panama is a cheap imitation of the Panama hat made of a vegetable pulp paper cut into fine strips; the Philippine hats are cheap but not durable; leghorn hats are made of narrow straw braids sewed end to end.

Chain stores and hat specialists create their own styles in hats. Thus there is a multiplicity of models from which consumers choose, paying for the cost of creating the fashion. Independent selection not influenced by the mode should result in the purchase of more durable hats.[1]

Objectives Concerned with the Consumption of Hats

To know the chief kinds of men's and women's hats, their comparative value and cost.

To ascertain the advantages of cloth hats in relation to hats of other materials.

[1] The sources of information in this section are:
United States Tariff Commission, Tariff Information Series; *Fur Hats, Bonnets or Hoods, Straw Hats*, 1921.
Dyer, Elizabeth — *Textiles*, 1923.
United States Bureau of the Census, mimeographed press bulletins.

To know the difference in quality between fur-felt and wool-felt hats, and to identify both.

To ascertain whether or not women spend too much on hats.

To know the chief materials entering into women's cold and mild weather hats, and their relative merits and cost.

To know the principal materials which enter into straw hats, and their relative value.

To know the comparative value of sewn and woven hats.

To identify chip or wood shaving in hats and to guard against purchasing it as real straw.

To identify and know the relative value of Panama hats, Japanese Panama hats, Philippine hats, and leghorn hats.

To purchase hats without being influenced by style.

Underwear Consumption

Cotton is the chief fabric of men's underwear, only 18% of the underwear purchased being wool. Union suits are bought by men one and one-half times as often as drawers and shirts. Women do not wear union suits as frequently as they wear separate undergarments. The use of the knitted union suit increased 46.8% between 1914 and 1919 while the use of separate shirts and drawers decreased 21% for the same period. The fact that 5.4% less knitted underwear was produced in 1919 than in 1914 suggests that the knitted union suit is not only a comfort but an economy. While knitted silk underwear is still a negligible factor in the underwear of the mass of American people it is important to observe that it has increased four times in production from 1914 to 1919. Knitted underwear may be ribbed, flat, fleeced, balbriggan, or mesh. Ribbed underwear is most widely used. Woven underwear is made of cambric, longcloth, crêpe, muslin, satin, batiste, nainsook, silk jersey, and crêpe de chine. The 500 women whose habits of clothing consumption are reported in connection with the discussion of women's clothing used nainsook, longcloth, and muslin in 85% of their cotton underwear. Half of their silk underwear was made of crêpe de chine. The cheap grades of silk underwear are made from light-weight habutai and crêpe de chine.

Manufacturers report that showy underwear is popular among women and that the demand for new styles of underwear is exceeded only by that for outer apparel.[1] It is apparent that simplicity in women's underwear is needed to increase economy and durability.

In the manufacture of underwear cotton is made to appear like wool. Cotton mixed with wool does not shrink so much and for those who do not wish heavy underwear it is desirable. However, one should guard against purchasing mixed goods as all-wool because all-wool is more expensive than cotton.

The Underwear Committee [2] of the Knit Goods Manufacturers of America, acting on a complaint of the United States Federal Trade Commission, recommended the discontinuance of the use of certain improper labels. The improper labels were as follows:

Material Used:	Improperly Labeled as:
Worsted and cotton yarns	Worsted ribbed undershirts
Worsted, merino, and cotton yarns	Worsted union suits
Worsted, silk, and cotton yarns	Worsted ribbed underwear
	Silk and worsted underwear
Wool and cotton	Wool underwear
	Worsted underwear
Wool and cotton	Natural wool underwear
	Camel hair underwear
	Wool ribbed underwear
	Scotch wool
	Lamb's wool
	Persian fleece
	Natural merino
Cotton dyed in imitation of Egyptian cotton	Egyptian cotton
American underwear	French balbriggans

Objectives Concerned with the Consumption of Underwear

To know the relative merits and cost of knitted and woven underwear.
To know the relative merits and cost of union suits and separate garments.
To buy better grade of underwear.
To buy a larger annual quantity of underwear.
To know the relative merits of ribbed, flat, fleeced, balbriggan, and mesh knitted underwear.

[1] Bureau of Foreign and Domestic Commerce; *The Woman's Muslin Underwear Industry*, 114 f.; 1915.
[2] *Textile World*, October 25, 1919, page 2549.

To know the relative value of cotton, wool, and silk as material for underwear.
To know the relative value and cost of the chief woven fabrics used for underwear.
To know the effect of style on the cost of women's underwear.
To guard against purchasing mixed goods as all-wool or worsted.
To know the most important false label used in the sale of underwear.

Consumption of Men's Furnishings

Shirts and furnishings compose an important item in the man's budget, their combined value being greater than the annual expenditure for shoes. The survey of 12,000 families made by the United States Bureau of Labor Statistics shows that wage-earners wear cotton shirts almost exclusively, the total of silk and wool shirts being only 7% of all shirts worn by the men. A comparison of actual with standard conditions shows that an inferior grade of shirts is bought and that not enough of them are bought to meet the standard of decency. This means, of course, that changes of shirts are not as frequent as they should be.

The cheapest grade of men's shirts is made of percale. For work shirts chambray is used because it is durable and washes well. Gingham shirtings make up a large part of the consumption of medium- and high-grade color-woven cotton shirting. The bulk of fine shirting is called madras. The stripe in madras is sometimes made of artificial silk, which breaks down when laundered. Oxford shirting is a cloth of plain and mercerized cotton made in a basket weave. Medium- and high-grade shirts are made of poplin-weave shirting; Russian cord, which is a highly mercerized cotton; and soisette, also a highly mercerized cloth.[1] The low-grade shirting is printed and not woven. Silk shirts are made chiefly of habutai, pussy willow, silk broadcloth, silk jersey, crêpe de chine, and pongee. Pajamas are made chiefly of madras, crêpe, soisette, longcloth, chambray, muslin, nainsook, and flannel.

The handkerchiefs of the great mass of people are made of cotton, the chief fabrics being print cloths and longcloths. Linen

[1] United States Tariff Commission, Tariff Information Surveys; *Countable Cotton Cloths*, 70.

is especially adaptable for use in handkerchiefs but is too expensive for the mass of people. The better grade ties are made in small quantities of one design. A large portion of the better grade ties are imported from England, France, and Italy.

Objectives Concerned with Men's Shirts and Furnishings

To know the importance of men's furnishings in the budget.
To know the comparative value and cost of cotton, wool, and linen shirts.
To buy a good grade of shirts.
To purchase enough shirts to allow for adequate change.
To buy an adequate supply of collars, ties, and handkerchiefs.
To know the comparative value and cost of the following materials used in men's shirts: chambray, gingham, madras, oxford, poplin, Russian cord, soisette, habutai, pussy willow, silk broadcloth, silk jersey, crêpe de chine, and pongee.
To know the comparative value and cost of cotton and linen handkerchiefs.

The Consumption of Textile Furnishings

As an indication of the practice of the American people in purchasing textile furnishings, the table which represents the purchasing habits of 6180 northern families is given. Blankets are used twice as frequently as quilts and comforts. Cotton tablecloths are purchased seven times as frequently as linen tablecloths. Cotton napkins are used three times as frequently as linen napkins. Cotton towels are used twenty-seven times as frequently as linen towels.[1] The table also shows the relative importance of the various textile furnishings in the budget. Blankets, sheets, and curtains stand first and are of about equal rank. Quilts, pillow cases, and towels make a second group of equal rank. Window shades, tablecloths, and spreads are of third rank in importance.

[1] United States Bureau of Labor Statistics; *Monthly Labor Review*, January, 1920, page 31.

TABLE CIV

AVERAGE EXPENDITURE FOR TEXTILE FURNISHINGS BY 6180 NORTHERN FAMILIES

ARTICLE	AVERAGE NUMBER OF ARTICLES BOUGHT PER YEAR	AVERAGE COST PER UNIT	AVERAGE EXPENDITURE PER FAMILY
Pillow	.1	1.64	.21
Blankets	.5	3.39	1.78
Quilts and comforts	.2	3.70	.73
Sheets	1.3	1.31	1.65
Pillow cases	1.9	.41	.77
Spreads	.1	3.10	.45
Cotton tablecloths	.3	1.60	.47
Linen tablecloths	.04	4.08	.15
Cotton napkins	.3	.20	.06
Linen napkins	.1	.45	.03
Cotton towels	2.7	.28	.76
Linen towels	.1	.48	.06
Table oilcloth (yards)	.9	.35	.33
Window shades	.8	.78	.60
Curtains, draperies, etc.		1.76	1.76

Another indication of the habits of the consumption of textile furnishings is given in the following table taken from the mimeographed press bulletins of the United States Bureau of the Census. Since the imports and exports of these goods are negligible, this table represents the actual habits of the people fairly well. Linen is not included in the table because it is entirely imported. It should be remembered that cotton sheetings are used in the manufacture of wearing apparel. Of all the blankets produced in the United States, 58% were made entirely of cotton, 18% were made entirely of wool, 17% had cotton warps, and 7% were made of mixed-wool and cotton yarn. From figures reported by the United States Tariff Commission,[1] 59% of all the cotton towels produced in the United States were Turkish towels and 41% were plain or huck towels.

[1] United States Tariff Commission, Tariff Information Surveys; *Household Articles of Cotton*, 3.

TABLE CV

THE PRODUCTION OF TEXTILE FURNISHINGS IN THE UNITED STATES (1921)

ARTICLES	VALUE
Cotton sheetings	$158,216,000
Cotton sheets and pillow cases	4,209,000
Cotton pillow tubing	4,949,000
Cotton blankets	21,507,000
Cotton warp blankets	6,073,000
All-wool blankets	6,505,000
Cotton-mixed blankets	2,575,000
Cotton towels, toweling, wash cloths, bath mats, wiping and polishing cloths	13,393,000
Cotton turkish towels and toweling	13,755,000
Cotton bedspreads and quilts	11,002,000
Cotton table damask	10,760,000
Cotton Nottingham lace curtains	8,435,424

The *American Wool and Cotton Reporter* [1] states that there is an annual production of 20,000,000 sheets in the United States valued at $20,000,000. This indicates more exactly than the preceding table the extent of the use of sheets in the United States. This figure allots .83 sheet to the family annually as compared with the survey discussed in the preceding paragraph, which showed an annual purchase of .3 sheet per family. The cheapest cotton sheeting is unbleached and the best is made of percale.

It is possible to produce cotton blankets resembling wool by giving them a napped finish. This is sometimes done by the partial use of Chinese cotton, which is coarse and crinkly. Three types of cotton blankets are commonly made: staple blankets, which are the cheapest, plain woven with colored borders; wool-finish blankets with colored borders; and figure-woven blankets. A medium-grade blanket is from 60% to 80% wool. The more cotton there is in a blanket the heavier it is.

Comforts filled with wool and cotton wastes are the cheapest. The medium-priced comforts are filled with cotton batting and the better grade ones are filled with wool sheeting or fine down feathers.

[1] *American Wool and Cotton Reporter*, February 19, 1921, page 53.

Bedspreads are made of dimity ripplette, honeycomb or crochet, satin, marseilles, or cretonne.

Cotton towels are made in the form of pile fabrics, consisting chiefly of turkish towels; and non-pile fabrics, consisting of huck towels. Linen toweling is more than twice as expensive as cotton toweling. The cheaper grades either contain a large percentage of cotton or are made of the short, rough fibers. Good linen toweling is especially adapted for use in towels because of its absorbent quality. The chief kinds of linen toweling sold are crash, which is a rough toweling; damask, which has a figured weave; and huck.

Cotton table damask is an imitation of the more costly linen table damask, especially when mercerized. It is used in tablecloths, table runners, napkins, and doilies. Mercerized cotton napkins give good ordinary wear, but the consumer should avoid buying them at linen prices. Napkins are made with a cheap calender finish which breaks down when laundered.

Cotton window hollands are plain-woven cotton sheetings which are filled to make them opaque. They are then dyed and glazed. Cheap window-shade cloths are finished by treating them with colored starch. Imported brown holland makes the most durable shades.

The medium-priced draperies are made of cretonne, chintz, printed muslin, cotton, and taffeta. The expensive draperies are made of velvet, velours, silk damasks, chenille, and tapestries. Slip covers for protecting furniture are made of Belgian linen, light weight canvas, denim, duck, drill, jean, cretonne, and chintz.

Sheets, pillow slips, bedspreads, and blankets come in standard sizes with which the consumer should be familiar. The width of linen sheets varies by quarter yards. The usual width for single beds is 63 inches, and the usual size of pillow cases is 22 × 34 inches. Pillow tubing is made from 42 to 54 inches in circumference.

The chief sources of information not mentioned in the footnotes in this section were:
Dyer, Elizabeth — *Textiles.*
Thompson, E. B. — *Cotton and Linen Departments.*
United States Tariff Commission, Tariff Information Surveys, *Cotton Table Damask.*

Objectives Concerned with the Consumption of Textile Furnishings

To know the relative importance of the textile furnishings in the budget.
To know the grades of sheets produced.
To identify cotton blankets with a nap and to avoid purchasing them at wool prices.
To know the three grades of comforts.
To identify the chief materials of which bedspreads are made.
To know the chief kinds of towels, their uses and advantages.
To identify cotton tablecloths and mercerized cotton tablecloths.
To know the relative merits of the chief window-shade materials.
To know the chief materials used as draperies and their relative cost.
To know the common sizes in which sheets, pillow slips, bedspreads, and blankets are sold.

The Construction and Care of Clothing

Three studies have been made of the clothing skills actually performed in the home. Florence E. Ward's report of the survey [1] of 10,000 rural families in 33 northern and western states showed that 96% did their own washing, 92% did their own sewing, 57% had washing machines, and 95% had sewing machines. Mabel Wilkerson [2] studied the returns of 1400 questionnaires from 10 counties in Illinois and found 20.1% of the women made all their own clothing, 65.4% made only the simple types of clothing, 53.8% made the children's clothing, 8.6% did not sew at all, 15.4% knew their clothing expenditures, and 15.4% made shirts. J. B. Leeds [3] found in his study of 60 families that 75% of the families made clothing and spent an average of $5\frac{3}{4}$ hours per week in doing it. The garments most frequently made at home were dresses, shirtwaists, petticoats, skirts, hats, and nightrobes. Of the same families, 83% bought clothing ready-made. An average of 4 hours per week was spent in the repair of clothing, $4\frac{1}{4}$ hours per week were devoted to washing, and 6 hours to ironing. Of

[1] Ward, F. E. — *The Farm Woman's Problem;* United States Department of Agriculture (Department Circular 148).
[2] From a mimeographed report in possession of Dr. Andrews, Teachers College.
[3] Leeds, J. B. — *The Household Budget*, 50 f.

these families 8% used professional laundries entirely, 15% did not use them at all, 50% employed laundresses. Two hours per week were spent in cleaning, sorting, and putting away clothing.

All things being equal, the skills connected with the repair of clothing should be mastered in proportion to the relative expenditures for the various garments. Women's and girls' clothing rank first and include suits, coats, skirts, waists, and dresses. Men's and boys' clothing rank second and include suits and coats. Boots and shoes rank next. These are followed by millinery, skirts, underwear, fur goods, hats and caps, rubber boots and shoes, men's furnishing goods, gloves, corsets, suspenders, and sweaters. In connection with these articles there are definite skills to be acquired which will not be discussed here but which will be included as objectives because they are commonly recognized as clothing repair skills.

Bulletin 23 [1] of the Federal Board for Vocational Education gives specifically a list of garments which can be remodeled from worn garments. Such economy requires the ability to make the following garments: children's coats, dresses, trousers, waists, blouses, rompers, petticoats, aprons, skirts, corset covers, napkins, and handkerchiefs.

The ability to make certain simple garments yields definite advantages of economy, durability, and taste. The investigation of the United States Tariff Commission into the ready-made clothing industry showed that about 25% of the price paid to the retailer goes to the manufacturer of cloth.[2] The cost of raw materials in the manufacture of women's muslin underwear was 57.93% of the wholesale price.[3] The comparative quality of materials produced for the counter and for the manufacturer is illustrated by the trade in ginghams. The latter going to the counter trade cannot be replaced by printed imitations even in the lowest grade. Low-grade shirting, however, is printed be-

[1] *Clothing for the Family*, 101.
[2] United States Tariff Board; *Wool and Manufactures of Wool*, 18; 1912.
[3] United States Bureau of Foreign and Domestic Commerce; *The Women's Muslin-Underwear Industry*, 51; 1915.

cause it is made into shirts by the manufacturer and sells as well as shirting with woven colors.[1]

The washing and cleaning of clothing presents definite problems arising from the relation of the fabric to the chemical constituents of soap, to temperature, to the fastness of dyes, and to mechanical action. Approximately 2,500,000 washing machines, or one in every nine homes, are in use.[2] The special problems which arise in connection with their use should be considered in the school.

The removal of spots and stains is dependent on definite chemical changes. The knowledge of these changes should be embodied by the householder into simple habits. The common stains are grease, ink, food stains, and paint.

The common problems connected with the care of clothing are the storing of clothing between seasons; temporary storing of clothing while not in use; the use of devices which conserve clothing, such as shoe-trees and moth bags; and the brushing of clothing.

Objectives Concerned with the Construction and Care of Clothing

To use and care for a sewing machine.
To sew by hand.
To know roughly the relative cost of home-made and ready-made garments of the several easily made in the home.
To use and care for a washing machine.
To repair suits, coats, skirts, waists, dresses, and other garments.
To use the material in worn garments in making clothing.
To make simple garments.
To interpret and alter a pattern.
To remove spots and stains of grease, ink, food, and paint.
To launder clothing.
To know the effect of different soaps on clothing.
To know the effect of soap on the several textile fabrics.
To know the effect of temperature on the several textile fabrics.

[1] United States Tariff Information Surveys; *Countable Cotton Cloths*, 77.
[2] *Crain's Market Data Book and Directory*, 1922, page 219.

To know the effect of rubbing on the several textile fabrics.
To store clothing between seasons.
To store clothing when not in use.
To use special devices to conserve clothing.
To know the effect of living organisms on clothing.
To clean gloves.
To clean straw hats.
To store furs.
To know the effect of weather on clothing.

Clothing Measurement and Calculation

Arithmetical calculations occur directly in the making and repairing of clothing. The tape measure is a universal tool in the home. Ease in manipulation of the units of linear measure should aid considerably in economies which are dependent upon a more intelligent interpretation of directions of patterns and in original tasks of construction and repair of clothing.

The relative importance of the arithmetical operations involved in the purchase and use of clothing is shown by G. M. Wilson's study of the social and business usages of arithmetic based upon the actual numerical operations of 4068 persons of varying occupation and location.[1] He found that clothing as a topic of arithmetic occurred in 17.92% of all problems. Of the 2565 operations relating to clothing, 1195 pertained to dry goods, 834 were miscellaneous, 434 pertained to clothing, 89 pertained to shoes, 9 pertained to merchandise, and 4 to millinery.

W. W. Charters gives the results of an unpublished inquiry made by Mrs. T. T. Callaway to ascertain what arithmetical information was necessary to understand Laura I. Baldt's *Clothing for Women*. Long measure and United States money were the two most important measures used. The inch occurred 1122 times out of a total of 1723 uses of measuring units. The dollar sign occurred 454 times and the yard 70 times. Fractions were used as shown in the following table:

[1] Wilson, G. M. — *A Survey of the Social and Business Usage of Arithmetic*, 31 f.; 1919.
[2] Charters, W. W. — *Curriculum Construction*, 241 f.; 1923.

TABLE CVI

OCCURRENCE OF FRACTIONS IN CLOTHING CALCULATIONS

FRACTION	FREQUENCY OF OCCURRENCE
$\frac{1}{2}$	214
$\frac{1}{4}$	248
$\frac{1}{6}$	15
$\frac{1}{8}$	108
$\frac{1}{10}$	16
$\frac{1}{12}$	5
$\frac{1}{16}$	9

Objectives Concerned with Clothing Calculation and Measurement

To use long measure in calculation.
To use United States money in calculation.
To use $\frac{1}{2}$, $\frac{1}{4}$, and $\frac{1}{8}$ in calculation.
To multiply a whole number by a fraction.
To reduce inches to yards and *vice versa*.
To use a tape measure.
To interpret the measures on labels of pillow slips.

CHAPTER X

OBJECTIVES ARRANGED BY SUBJECTS

Thus far the objectives of education for effective consumption have been recorded in their natural order of occurrence in life. It is the purpose of this chapter to restate these objectives under the heads of the familiar school subjects in order to make the material available to the teacher and administrator in a convenient and familiar form.

This experiment in reclassifying the objectives should not be construed as approval of this procedure by the author. On the contrary, it has convinced him of the fundamental error of the conventional subject organization of the curriculum. It has revealed that any artificial classification of educational objectives or school activities is arbitrary, causes wasteful overlapping, and distorts rather than reproduces life. The regrouping of objectives, however, is willingly presented as a compromise in the interest of progress.

The subjects represented here are household arts, industrial arts, social studies, arithmetic, science, health, and safety lessons. There is much overlapping of objectives and of subjects. No sharp line of demarcation has been drawn between household arts and industrial arts. The former incline more toward food and clothing while the latter incline more toward housing and fuels. Topics pertaining to household economics have not been classified separately but were forced into the ranks of household arts, industrial arts, and social studies.

It is necessary to say a special word about the language objectives for effective consumption of economic goods. They have not been classified here because they are inseparable from the activities listed in this chapter. It is essential, however, to recognize that

training for effective consumption is impossible without introducing into the language curriculum an entirely new vocabulary and a new literature. The makers of word books have not included this vocabulary because their word lists are based on present usage, no matter how imperfect it may be. The makers of language texts and courses have not introduced this literature because it is beyond the present scope of language study.

The new vocabulary includes the terminology of foods, nutrition, purchasing, measurement, housing, rent, building materials, lumber, paint, leather, fuels, lighting, heating, clothing fabrics, and clothing articles. The new literature includes advertising matter in the form of circulars, letters, billboards, newspapers, etc.; printed directions in the form of labels, recipes, booklets, patterns, etc.; government bulletins; market reports; diagrams; formula books; store catalogues; mail-order catalogues; magazine and newspaper articles; purchasing contracts; building contracts; plans and specifications; part-payment contracts; public records; trade journals; stock certificates; publications of consumers' organizations; and the general literature of consumption economics.

It should be remembered that the statements presented here under each subject are objectives and not school activities. In some cases the school activities are easily recognizable and often even coincide with the objectives. In other cases the school activities are only remotely suggested by the objectives.

Finally, this classification is subjective, tentative, and advisory. It is intended as a guide to the user of this book, not as a final program.

Household Arts

1. *Selection of Food*

To know that wheat, dairy products, beef, and pork are the great sources of protein.

To know that wheat, sugars, corn, potatoes, and dairy products furnish nine-tenths of all the carbohydrates.

To know that pork, dairy products, vegetable oils, and beef furnish nearly nine-tenths of all the fat intake.

To know the relation in general terms between the weight of food and its nutritive value.
To know roughly the amount of calories, protein, and ash in the common weights and measures of food.
To consume more vegetables and fruits by weight.
To consume less meat, fats, and sugar by weight.
To spend a proper proportion of money for dairy products.
To spend less money for meat.
To spend less for coffee and tea.
To consume more beans and peas.
To consume more vegetables and fruits.
To consume less meat, sugar, and fats.
To know the chief energy-giving foods.
To eat more potatoes.
To ascertain roughly the cost and quantity of food necessary to meet the daily energy requirement.
To ascertain whether one's ordinary diet is deficient or excessive in caloric value.
To know the function of protein, fats, carbohydrates, calcium, iron, and phosphorus in the diet.
To know the function of the mineral salts in the diet.
To select food with an eye to its dietary functions.
To assure the presence in every meal of: (1) fruits and vegetables, (2) protein foods, (3) cereals and starchy foods, (4) fatty foods.
To guard against the overconsumption of fats.
To guard against the overconsumption of proteins, particularly in the form of meat.
To consume a sufficient quantity of milk, vegetables, and fruits.
To consume a sufficient quantity of calcium and iron in foods.
To know the foods rich in protein, carbohydrates, calcium, phosphorus, and iron.

2. *Consumption of Dairy Products and Meat*

To form the habit of drinking milk daily.
To know the nutrient value of milk.
To use butter or a butter substitute with every meal.
To know the constituents of oleomargarine and its relation to butter as a food.
To realize without prejudice the function and nature of oleomargarine.

To draw upon milk especially as a source of calcium.
To consume more milk in the raw form.
To know that milk contains all the important nutrients required by man.
To know the relation of milk to butter and to cheese.
To cultivate the habit of eating more cheese.
To know the specially high food value of cheese.
To correct the impression that cheese is difficult to digest.
To know the relative cheapness of cheese.
To know the fruits and vegetables with which cheese combines effectively.
To know the relation of raw milk to evaporated milk, condensed milk, and ice cream.
To know the nutritive functions of milk, butter, cream, condensed milk, evaporated milk, cheese, and ice cream.
To know the function of pork, beef, mutton, lamb, and veal in the diet.
To know that pork is especially rich in fats.
To identify the chief cuts of beef, veal, mutton, lamb, and pork and to know their most appropriate uses.
To know the relative food value of the various cuts of beef, veal, mutton, lamb, and pork.
To cultivate the habit of buying the most economical cuts.
To know that the function of meat in the diet can be served by meat substitutes.
To spend less money on meat.
To cultivate the habit of buying less meat.
To know that meat is the most expensive protein food.
To know in terms of weight just how much meat is sufficient for each member of the family.
To use milk, eggs, beans, peas, cheese, nuts, and fish instead of meat.
To consume more fish.
To know the relative value of meat and fish as protein foods.
To know that the total food bill increases as the expenditure for meat increases.
To know that the greater the expenditure for meat, the less is the total nutritive value of the diet.

3. *The Consumption of Vegetables, Fruits, etc.*

To give the vegetables their proper place in the thinking and habits of the food plan of the people of our nation.

To use and to think of potatoes primarily as a starch food.
To use and to think of the green vegetables primarily as foods rich in calcium, phosphorus, and iron salts.
To use and to think of the legumes as rich in protein foods, with an abundance of calcium and iron.
To cultivate the habit of using spinach as a rich and cheap food.
To use tomatoes less in bulk and more for flavoring.
To use more dried beans and peas.
To know roughly the relative cost and food value of: potatoes, sweet potatoes, tomatoes, cabbages, onions, cantaloupes, watermelons, celery, cucumbers, lettuce, beans, peas, asparagus, green peppers, spinach, and carrots.
To know the effect of home and commercial canning on beans, peas, and tomatoes.
To know exactly what place the fruits occupy in the food plan.
To use and think of bananas as a starch food.
To use and think of the dried fruits as starch foods.
To use and think of raisins and prunes as foods rich in iron.
To consume more figs, dates, raisins, and prunes.
To know the relation between fresh and dried fruits as well as their comparative quality and economy.
To know the relation between fresh and canned fruits as well as their comparative quality and economy.
To know roughly the relative food value and cost of apples, grapes, peaches, oranges, strawberries, pears, plums, prunes, bananas, apricots, currants, cranberries, figs, dates, lemons, and pineapples.
To know the function of the cereals in the diet.
To know the forms in which cereals occur and to recognize them as such.
To know that the cost of food can be decreased by increasing the amount of cereals in the diet.
To know the relative value and economy of the several cereals and cereal products.
To know the special value of oatmeal as a carbohydrate and protein food.
To increase the consumption of oatmeal and corn meal.
To know the special value of whole-wheat bread and to increase its consumption.
To know roughly the relative food value and cost of wheat, corn, rice, rye, barley, oats, and their products.

To know that coffee and tea contribute nothing to nutrition.
To know that cocoa is rich in protein, fat, and carbohydrates.
To increase the consumption of cocoa.

4. *Relation between Selection and Cost of Food*

To know the relative cost of food and the nutrients of food.
To know that the cereals are an inexpensive form of food.
To know that pork and beef are expensive foods.
To know that sugar is cheap as a carbohydrate food.
To know that corn is an inexpensive food.
To know that the legumes are inexpensive foods.
To know that cocoa is an inexpensive food.
To know that the meats give a small return in food value in relation to the money spent.
To know that eggs are an expensive food.
To know that too much money is spent for coffee and tea.
To know that cheese in an inexpensive food.
To know that oatmeal is inexpensive.
To order ready-to-serve foods in such a way as to get the most food value for the money available.

5. *Purchasing Food*

To buy in large quantities foods which can be stored, such as sugar, potatoes, flour, cereals, dried fruit, dried vegetables, canned fruit and vegetables, cocoa, coffee, condensed milk, and lard.
To discontinue the practice of purchasing for small coins.
To discontinue the practice of buying small quantities or fractions of a measure.
To buy goods through buying clubs.
To ascertain the difference in wholesale and retail prices of the chief food commodities.
To purchase wholesale those commodities on which there is the largest advantage over retail purchases.
To ascertain what package goods may be bought in bulk.
To ascertain what the actual difference between food bought in bulk and food bought in packages is.
To purchase milk in bulk.
To buy bread by the pound.

To check up the cost of bread when bought by the package.
To know the loss in money in purchasing sugar in small cartons.
To ascertain the difference in cost between fresh and canned goods.
To ascertain the intrinsic value of food bought in cans.
To know that peach baskets, round stave baskets, and lettuce hampers are made in varying sizes which are similar in appearance but which differ in volume.
To check up the contents of peach baskets, round stave baskets, and hampers.
To know the federal law establishing a standard barrel for fruits and vegetables, and a standard basket for small fruits.
To know that all food packages are required by law to be marked with the net contents.
To ascertain what fruits, vegetables, and other food products vary in price with the seasons.
To form the habit of substituting a less expensive food article having the same nutritive properties for one which, during certain seasons, becomes expensive.
To buy a substitute for an article when its price changes suddenly.
To know when the important foods are in season.
To buy food commodities when they are in season, in order to get fresher and cheaper food.
To know that delivery and credit are services which are paid for in increased cost.
To ascertain the saving incurred by purchasing at cash-and-carry stores.
To become aware of the problem of marketing as it affects the consumer with respect to quality and price of food products.
To compare the quality and price of food commodities bought at public markets and at retail stores.
To ascertain the advantages, if any, of buying food products directly from farmers by trucks, express, or parcel post.
To know the effect of supply, storage, and shipment upon the price of food in a particular community.
To coöperate with dealers to improve conditions of marketing.
To know roughly the present schemes of grading food products.
To know the chief sources of the important foods in any community and their bearing upon quality and price.
To purchase foods for their intrinsic worth.

To ascertain the real value of storage products.
To overcome the unwarranted prejudice against cold-storage goods.
To judge butter primarily by its nutritive value.
To buy fruits, especially apples, for their intrinsic value rather than for their color.
To know the market names of the edible parts of the carcasses of beef, pork, mutton, and veal.
To know the relative cost of these parts.
To buy the various cuts of meat for economy and food value rather than for their reputation among the neighbors.
To buy bread for its value and not for its color.
To buy corn meal irrespective of color.
To buy onions irrespective of color.

6. *Storage and Preparation of Food*

To store fruits, vegetables, and cereals.
To preserve fruits and vegetables.
To dry fruits and vegetables, especially beans, peas, pears, peaches.
To store potatoes, apples, and onions in open bins or boxes.
To can corn, beans, peas, tomatoes.
To can fruit.
To preserve eggs in water glass.
To make a drier of small-mesh, galvanized wire netting.
To use the cookstove oven for drying.
To keep insects away from food.
To pack and store dried food.
To discover whether one's food habits are based on custom rather than on economy and health.
To help the immigrant adjust himself to an American diet.
To ascertain the extent of saving which results from home cooking.
To use prepared food only when necessary or when more economical.
To prepare and cook the dairy products, cereals, meats, fruits, vegetables, and eggs.
To increase the consumption of cheap foods by especially learning to prepare and cook them in a palatable way. These are: cheese, vegetables, fruits, legumes, fish, oatmeal, corn, barley, and cocoa.
To use the flavor of meat in cooking grains, legumes, and nuts in order to increase their consumption.

To flavor the rich protein foods with tomatoes, onions, mushrooms, peppers, and spices.
To make cheese and to use it in cooking.
To cook flank steak, chuck or round steak, chuck roast, neck of beef, and cross rib to make them serve as well as the expensive cuts.
To avoid waste of juices in cooking and cleaning meat.
To know how to cook the tougher cuts of meat.
To know the effect of heat on the flavor and food value of: milk, bread, cereals, meat, eggs, and potatoes.
To cook dried fruit and vegetables.
To prepare palatable beverages with milk as the foundation.
To know the loss of nutrients due to boiling vegetables.
To cut vegetables to reduce the losses in nutrients.
To know the value of steaming vegetables and to practice it.
To consume proper food when suffering from colds, sore throat, headache, indigestion, constipation, and dysmenorrhea.
To feed properly those suffering from the above ailments.
To feed the infant properly.

7. *Waste of Food, etc.*

To consume all the edible food which is purchased.
To save odds and ends of vegetables and meat for soup.
To make palatable dishes of left-over food.
To extract and conserve all the fat in meat.
To use the by-products of potatoes, carrots, cabbage, bean-pods, fruits, and milk.
To avoid waste in paring vegetables.
To purchase enough food and not too much.
To select efficient cooking appliances.
To burn gas only when necessary.
To use low or high pressure when necessary.
To adjust the spud to the pressure used.
To raise or lower the cooking vessel to get maximum heat.
To reduce waste of fuel from unnecessary radiation.
To adjust the damper, check damper, coal door, ash-pit door in order to get maximum efficiency in cooking.
To use wood in making light, quick fires.
To mix wood with coal as fuel where wood is cheap and abundant.
To determine whether electric cooking is economical.

To test the relative cost of fuels for cooking.
To produce the kind of flame which gives most heat.
To prepare the table in a convenient and orderly manner for meals.
To serve food in a most economical and orderly manner.
To acquire clean and orderly table practices.
To select dishes, silverware, refrigerator, food chopper, freezer, cooking range, cleaning and polishing preparations, and other utensils which are most economical and serviceable.
To use ice economically.
To make and use a fireless cooker.
To test and adopt newly discovered improvements in kitchen appliances.
To evaluate the appliances of the commercial market.
To decorate the table for meals.
To wash dishes efficiently.
To organize the kitchen so as to save time and labor.
To judge the quality of plated silver from the method of marking it.
To select appropriate utensils for baking, roasting, stewing, sautéing, frying, candy-making, and jelly-making.
To know the relative value of ironware, tin-plated ware, aluminum, and enamel ware.

8. *Housing Conditions*

To know the fundamental elements which determine the quality of a home.
To install proper lighting apparatus to offset the effect of dark rooms.
To be specially trained in matters of ventilation.
To provide and care for play space for children.
To know how to keep a courtyard in good condition.
To use a makeshift for the bath.
To cultivate the habit of keeping flower boxes and other decorations.
To maintain cleanliness in the halls of the house.
To ventilate toilets properly.
To select carefully and patiently an apartment which will not result in overcrowding.
To secure privacy by proper adjustment and use of screens and the like.
To manage the home in such a way as to increase the comforts for those who must perforce live in homes below the standard.
To use deodorizers.

9. *Purchase of Household Articles*

To adjust the budget so as to be able to buy durable furniture instead of cheap furniture.

To buy cheaper quality of less permanent things to enable one to purchase good furniture.

To know what constitutes a complete equipment of furniture in the dining room, living room, bedroom, and kitchen.

To identify the following kinds of carpets and rugs: Axminster, Wilton, Brussels, velvet, tapestry, ingrain, wool and paper rugs, rag rugs.

To know the relative merits of these rugs.

To know the relative cost of these rugs.

To know the three forms in which they come: carpets, rugs made of sewed strips, and rugs woven whole.

To know the relative advantages of these three forms.

To know the merits and defects of wool-fiber rugs.

To know the merits of the all-fiber rugs.

To know the relative advantages and cost of floor oilcloth, linoleum, inlaid linoleum, and floor coverings with a felt back.

To guard against purchasing floor coverings sold as linoleum, but which contain substitutes for the cork and linseed oil which go into genuine linoleum.

To select a good laundry soap.

To select a good toilet soap.

To know the chief raw materials which enter into soap.

To check up and identify when possible the basic fat or oil in soaps.

To know the relative cleansing quality of the several kinds of soaps.

To distinguish hard and soft soap and to know their appropriate uses.

To know the meaning of the several terms used in connection with soap advertising.

To identify palm oil soap, olive oil soap.

To select an appropriate soap for hard water.

To purchase soap which is not adulterated.

To identify adulterated soap.

To avoid using rosin soap for washing clothes.

To guard against deception by perfumes.

To identify and select appropriate medicated soap.

To cultivate the habit of using formula books, such as, *The Scientific American Cyclopedia of Formulas*, and *Henley's Twentieth Century Book of Formulas, Recipes, and Processes.*

To ascertain the advantages of newly discovered preparations.
To make the cleansing and polishing preparations which consist of simple solutions sold under trade names.
To know the appropriate cleansing and polishing preparations to use for walls, ceilings, wood surfaces, floor coverings, windows, mirrors, copper, brass, nickel, earthenware, iron, enameled ware, stoves, floors, and furniture.
To guard against preparations which injure metals.
To know and identify the common grease solvents: benzol, alcohol, turpentine, benzine, gasoline, chloroform, and carbon tetrachloride.
To know which are inflammable.
To purchase the common disinfectants in the chemical form, as formaldehyde, carbolic acid, creosote, pine oil, bleaching powder, and bichloride of mercury.
To identify some common cleansers and polishes, such as borax, sodium carbonate, caustic potash, caustic soda, lye, camphor, and sulphur.
To distinguish glue, mucilage, paste, and cement.
To select appropriate adhesive materials in woodwork, and in the repair of furniture, leather, china, rubber, and paper articles.
To make such adhesives in the home as can be simply prepared.
To know the relative values and appropriate uses of animal glue and liquid glue.
To select specially prepared water-resisting glue for articles of wood which are exposed to moisture.
To identify glue which has great adhesive strength.

10. *Clothing Standards*

To differentiate between expensiveness and real worth in clothing.
To understand the nature of fashions in clothing.
To know how fashions affect the wearing quality of clothing.
To know the effect of fashions in individual choice of clothing.
To know the effect of staple fabrics and novelty fabrics on price.
To adjust the family expenditure to make it possible to buy more and better clothes.
To regard durability as a primary factor in clothing consumption.
To buy clothes that are expected to last longer than a single season.
To have practice in judging durability as based on ply of yarn, length of fiber, weave of fabric, closeness of the weave, and the presence of weighting and sizing material.

To purchase raincoats, rubbers, gloves, and underwear with special emphasis on their hygienic value.

To know the relative capacity of the chief clothing fabrics to withstand the cold.

To know the effect of the number of layers of clothing on warmth.

To know the effect of red goods on warmth.

To know the effect of color on warmth.

To know the effect of absorption and evaporation on health and comfort.

To know the relative capacity of the chief clothing fabrics to absorb and evaporate moisture.

To know the relation of free movement of the body to clothing selection.

To know the relation between clothing selection and the weight of garments.

To know how to launder wool, silk, cotton, and linen.

To have abundant practice in exercising taste with respect to color combinations and designs in clothing.

To know the color schemes which observation and analysis have shown to be most highly effective.

To know the effect of color on the form and line of clothes.

To know the effect of artificial light on the color of fabrics and to practice the use of this knowledge in clothing purchases.

11. *The Chief Clothing Fabrics*

To know the chief articles of wearing apparel made of cotton.

To know the chief fabrics made of cotton.

To know and identify the chief articles of wearing apparel made of sheetings, percales, organdies, dimities, lawns, nainsooks, cambrics, and ginghams.

To know the comparative value and cost of these fabrics.

To identify cotton treated with glycerine, starch, mucilage, gum, or china clay.

To identify and know the value of mercerized cotton.

To identify and know the value of cotton having a lisle finish.

To know the special merits of combed cotton yarns.

To know the basis of the size of the cotton yarn or thread.

To know the special function of wool as clothing.

To know the chief raw materials which enter into wool garments and their effect upon the quality of clothing.

To understand the meaning of reworked wool and the effect of its use in clothing.
To know the meaning of virgin wool and to avoid being misled by its use as a general term.
To know the cloths in which reworked wool usually appears.
To recognize, when possible, the presence of cotton in a wool garment and to know its effect upon its quality.
To know the difference between woolen and worsted goods and their relative merits.
To identify alpaca and mohair goods.
To know the factors which determine the quality of woolen goods and to identify these factors in the finished cloth when possible.
To have a stock of fundamental facts to use in questioning sales clerks as to the value of woolen goods.
To purchase clothing of better and more durable quality.
To identify cotton when it is sold as wool.
To know the common wool fabrics, such as albatross, broadcloth, cheviot, homespun, and serge, and their special uses.
To know in what garments silk is chiefly used and whether it is used appropriately in these garments.
To know the peculiar value of silk as the raw material of clothing.
To know the difference between thrown silk and spun silk.
To identify artificial silk.
To know its chief uses.
To know its chief limitations.
To know the comparative cost of real and artificial silk.
To distinguish between mercerized cotton and real silk.
To know the misleading names for fabrics made of mercerized cotton.
To know of the practice of exposing a silk surface on a cotton base.
To know and identify silks weighted with metal salts.
To guard against purchasing mixtures of cotton and silk for pure silk at the price of pure silk.
To guard against cotton mixtures in corded material.
To know the names of the fabrics in which mixtures are usually found.
To identify and know the fabrics which are sold under names which suggest that they are made of silk but which contain no silk.
To know the names of the chief fabrics made of silk.
To know the special characteristics of linen as a clothing material.
To know the laundering properties of linen.

To know the effect of dyes on linen.
To know the uses for which linen is especially adaptable.
To know the characteristics of Irish, Scotch, Belgian, German, Austrian, Russian, and English linens, and their effect on quality and price.
To guard against buying adulterated linen as pure linen or at the price of pure linen.
To distinguish mercerized cotton from linen.
To guard against buying union towels, tablecloths, handkerchiefs, and dress goods for pure linen.
To test for the presence of cotton in linen goods.
To distinguish cotton from linen by making a simple test.
To recognize linen that is sized or finished with starch, glue, or gum.
To know the common linen fabrics and their appropriate uses.
To know the misleading names under which substitutes for linen are sold and to purchase them only for their true worth.
To use textile knowledge in removing fraudulent practices in the manufacture and sale of linen.
To distinguish the expensive group of furs from the inexpensive group.
To know and identify the chief skins consumed by the American people.
To know the relative cost of these skins.
To know the relative durability of these skins.
To know the names under which the inexpensive furs are commonly sold.
To know that sunshine, heat, and oil attack rubber fabrics.
To know the three kinds of raincoats and their relative value.
To know the chief textile materials used as a base for rubberized cloth and their relative quality and cost.

12. *The Chief Articles of Clothing*

To identify the common materials of which suits, coats, skirts, waists, and dresses are made.
To know the relative value of these materials.
To know the relative cost of these materials.
To buy clothing of better quality.
To order the budget so as to make possible the purchase of more durable garments.
To purchase an adequate quantity of dresses and skirts for decent living.

To know in general the cost and durability of standard garments.
To know the relative advantages of cotton, silk, wool, and linen in skirts, suits, coats, and dresses.
To buy an adequate supply of suits.
To buy suits of better quality.
To know the staple fabrics which enter into suits and overcoats for men and boys.
To know the relative value and cost of these fabrics.
To know the effect of style on men's clothing.
To know the place of shoes in the budget.
To know the technical names of the various parts of the shoe.
To know how each part affects the quality, cost, and comfort of the shoe.
To know the chief kinds of leather which go into the upper of a shoe; to know their relative merits and cost.
To identify the leather used in the upper of a shoe.
To know and to identify the chief finishes in which upper leathers are sold.
To distinguish between the name of the leather and the name of the finish.
To know the kinds of leather that go into soles and their relative quality.
To recognize the quality of a shoe by the stitching and the welt.
To fit a shoe properly.
To know the system used for recording the sizes and widths of shoes.
To be acquainted in a general way with the cost of manufacture of shoes.
To know the principal materials which enter into hosiery and their comparative value and cost.
To guard against buying wool-mixed and silk-mixed as the genuine articles.
To distinguish between real and artificial silk in hosiery.
To identify mercerized cotton hosiery and to know its merits.
To identify lisle hosiery and to know its merits.
To identify wool-mixed, all-wool, and cashmere hose.
To distinguish cut hose, fashioned hose, and full-fashioned hose.
To guard against false seams in tubular hose.
To know the chief kinds of men's and women's hats and their comparative value and cost.
To ascertain the advantages of cloth hats in relation to hats of other materials.

To know the difference in quality between fur-felt and wool-felt hats, and to identify both.

To ascertain whether or not women spend too much on hats.

To know the chief materials entering into women's cold- and mild-weather hats, and their relative merits and cost.

To know the principal materials which enter into straw hats, and their relative value.

To know the comparative value of sewn and woven hats.

To identify chip or wood shaving in hats and to guard against purchasing it as real straw.

To identify and know the relative value of Panama hats, Japanese Panama hats, Philippine hats, and leghorn hats.

To purchase hats without being influenced by style.

To know the relative merits and cost of knitted and woven underwear.

To know the relative merits and cost of union suits and separate garments.

To buy a better grade of underwear.

To buy a larger annual quantity of underwear.

To know the relative merits of ribbed, flat, fleeced, balbriggan, and mesh-knitted underwear.

To know the relative value of cotton, wool, and silk as material for underwear.

To know the relative value and cost of the chief woven fabrics used for underwear.

To know the effect of style on the cost of women's underwear.

To guard against purchasing mixed goods as all-wool or worsted.

To know the most important false labels used in the sale of underwear.

To know the importance of men's furnishings in the budget.

To know the comparative value and cost of cotton, wool, and linen shirts.

To buy a good grade of shirts.

To purchase enough shirts to allow for adequate change.

To buy an adequate supply of collars, ties, and handkerchiefs.

To know the comparative value and cost of the following materials used in men's shirts: chambray, gingham, madras, oxford, poplin, Russian cord, soisette, habutai, pussy willow, silk broadcloth, silk jersey, crêpe de chine, and pongee.

To know the comparative value and cost of cotton and linen handkerchiefs.

13. *Textile Furnishings*

To know the relative importance of textile furnishings in the budget.
To know the grades of sheets produced.
To identify cotton blankets with a nap and to avoid purchasing them at wool prices.
To know the three grades of comforts.
To identify the chief materials of which bedspreads are made.
To know the chief kinds of towels, their uses and advantages.
To identify cotton tablecloths and mercerized cotton tablecloths.
To know the relative merits of the chief window-shade materials.
To know the chief materials used as draperies and their relative cost.
To know the common sizes in which sheets, pillow slips, bedspreads, and blankets are sold.

14. *Construction and Care of Clothing*

To use and care for a sewing machine.
To sew by hand.
To know roughly the relative cost of home-made and ready-made garments of the several easily made in the home.
To use and care for a washing machine.
To repair suits, coats, skirts, waists, dresses, and other garments.
To use the material in worn garments in making clothing.
To make simple garments.
To interpret and alter a pattern.
To remove spots and stains of grease, ink, food, and paint.
To launder clothing.
To know the effect of different soaps on clothing.
To know the effect of soap on the several textile fabrics.
To know the effect of temperature on the several textile fabrics.
To know the effect of rubbing on the several textile fabrics.
To store clothing between seasons.
To store clothing when not in use.
To use special devices to conserve clothing.
To know the effect of living organisms on clothing.
To clean gloves.
To clean straw hats.
To store furs.
To know the effect of weather on clothing.

Industrial Arts

1. *Building Materials and Furniture*

To keep one's apartment in good repair and to demand that the house be kept in good repair.

To know how to keep a courtyard in good condition.

To take special pains to increase privacy.

To install ventilation devices, such as window shields and deflectors.

To know the chief raw materials of building construction and repair.

To know the relative importance of brick, steel, lumber, and plumbing and heating materials in building construction.

To choose lumber with one's builder or carpenter.

To select wood for interior finish.

To know the relative durability of woods used in building construction.

To identify yellow pine, Douglas fir, western yellow pine, hemlock, spruce, cypress, and redwood.

To know the grading scheme for lumber.

To know the standard sizes in which lumber is sold.

To recognize the common defects in lumber, such as knots, shakes, checks, warping, and rot, and to determine to what extent these defects affect one's particular use of the lumber.

To know the most suitable wood for light framing, beams and girders, siding and exterior finish, roof boards and sub-floors, shingles, flooring, doors, window frames, interior finish, cupboards, draining boards, and shelves.

To know that hardwoods warp more readily than softwoods.

To understand the following terms used in building construction: *sill, joist, girder, corner post, girt, roof-plate, stud, bridging, brace, cap, sole, splice, butt joint, mortise and tenon joint, cleat, doweled joint, framing, siding, rafters, sash, lath, shingle, tongue, groove, board foot.*

To know the appropriate uses of common brick, fire brick, hollow building tile, face brick, and architectural terra cotta.

To know their relative value as building materials.

To know their relative cost and how they may be ordered.

To identify earthen and porcelain sanitary ware and to know their appropriate uses.

To know the approximate prices of cement, sand, and lime, and how they may be ordered.

To keep a continuous stock of lime and to use it as fertilizer, disinfectant, deodorizer, insecticide, and in making mortar and plaster.
To use cement for cracks in basement floors; loose joints in brick, tile, and stone; and loose plaster.
To have such knowledge of cement as is necessary for the construction of walks, steps, driveways, fence posts, and foundations for outbuildings.
To recognize window glass and plate glass and to know their relative values.
To know the two thicknesses in which window glass comes.
To know the relative value and cost of single-strength and double-strength window glass.
To know the common woods which enter into the furniture of the nation, namely: oak, sap gum, red gum, maple, birch, chestnut, and poplar.
To know the relative cost of the chief furniture woods.
To know the best lumber to ask for in the purchase of a bookcase, kitchen cabinet, phonograph, and chair.
To distinguish birch from mahogany.
To distinguish gumwood from walnut
To identify a veneer.
To identify the print of quartered oak on cheaper woods.
To distinguish furniture which is made entirely of the wood designated; furniture of which all the exposed parts are made of the wood designated; furniture all the exteriors of which are made of the kind of wood designated, except case back, case bottom, and mirror back; furniture of which the tops, drawer fronts, doors, and ends are of built-up stock or solid wood of the kind designated; furniture of cheap wood with the finish of a more expensive wood.
To avoid being misled by furniture advertisements.
To know the relative durability of the chief furniture woods.

2. *Paint, Varnish, and Metal Products*

To learn that paint is a protective and sanitary product.
To use paint to protect wood, metal, and other materials.
To distinguish between paint, stain, varnish, and enamel.
To know the common ingredients of paint and varnish.
To become familiar with the sources of formulæ for paint and varnish.
To identify linseed oil.

To select the proper pigment.
To know the relative value of the four white pigments.
To learn the trade names of the important colored pigments.
To become familiar with the thinners, turpentine and benzol.
To become familiar with lead and manganese driers.
To mix paints in the home.
To avoid being misled when purchasing ready-mixed paints.
To distinguish ingredients of good quality from those of inferior quality.
To know the variety of ready-mixed paints that are sold.
To know the ingredients of a good varnish and to order it by specifying the basic ingredients.
To order varnish properly for indoor and outdoor purposes.
To become familiar with furniture varnish, spar varnish, shellac varnish, dammar varnish, and copal varnish and to know their appropriate uses.
To select the proper white pigment for maximum illumination.
To know the illuminating quality of the common interior colors.
To select paint properly for indoor and outdoor purposes.
To purchase and keep a hammer, handsaw, backsaw, miter box, plane, chisel, brace and bits, try square, folding rule, nail set, oil stone, vise, hack saw, soldering copper, pliers, screw driver, monkey wrench, file, glass cutter, and ax.
To distinguish between cast-iron, malleable cast-iron, and steel, the metals of which tools are commonly made.
To identify wrought iron and know its relative cost and when it is used.
To know the relative durability of cast-iron, wrought iron, malleable cast-iron, and steel.
To recognize good quality in table cutlery, razors, pocket knives, scissors, and shears.
To select brass or bronze for door knobs, hinges, window catches, plumbing fittings, and bathroom fittings.
To distinguish solid brass and bronze from iron or steel with a brass or bronze coating.
To know the relative cost of steel, brass, and bronze.
To know their relative merits as hardware articles.
To know the relative cost of brass and bronze articles.
To know the standard kinds, sizes, forms, and grades of files, chisels, nails, bits, and sandpaper, and how to order them.

3. *Miscellaneous Household Articles*

To know the chief materials which enter into paper products.
To distinguish rag from wood-pulp writing paper and bristol board.
To know the relative durability of common papers.
To know the varieties of writing and wrapping paper.
To know the appropriate uses of the several papers.
To identify regular-, linen-, and ripple-finish writing papers.
To distinguish rag-linen from linen-finish paper.
To purchase paper by the pound or ream.
To identify cowhide, calfskin, and sheepskin used in bags, cases, and upholstery.
To identify the grain of seal, walrus, alligator, and pigskin.
To distinguish grain from split leather.
To know the relative value of cowhide, calfskin, goatskin, sheepskin, horsehide, and pigskin.
To acquire the habit of ascertaining whether a grain is genuine or embossed.
To distinguish or to get aid in distinguishing pigskin from sheepskin with a pigskin grain.
To identify the following leather finishes: suède, morocco, Cordovan, levant, and enamel.
To identify imitation leather.
To know the comparative prices of leather goods and similar imitation-leather goods.
To know the common imitation-leather trade names, the comparative value of the products which they represent, and their composition.
To know the value of the wood which enters into phonographs.
To identify a good motor.
To know the construction of a reproducer and to select a satisfactory one.
To know the relative merits of jeweled point, semi-permanent, steel, and wood needles.
To select records for their quality of tone.
To know what needle will play a particular type of record.
To purchase an appropriate reproducer for records ordinarily not suited to a particular machine.
To know the sales policies of the phonograph dealers concerning deferred payments.

To know how to purchase an automobile.
To know the relative prices of the chief types which are manufactured.
To know the relative merits of the chief types of automobiles.
To select tires according to durability and cost.
To avoid unnecessarily rich mixtures.
To use carburetor and manifold equipment which give greatest fuel economy.
To keep a car in good repair.
To know the important accessories and their special advantages.

4. *Carpentry Skills, etc.*

To hang doors.
To repair swelled doors, to trim a projecting tenon, and to adjust doors which do not close.
To fix a shelf to a brick or plaster wall.
To put on new shingles.
To put hooks, nails, and screws into walls. To find the stud in a wall.
To design and construct a closet for cleaning materials.
To make a coal box, wood box, umbrella stand, blacking box, plant box, window board, and window screen.
To repair broken legs and broken joints in furniture articles.
To glue legs and joints in articles of furniture.
To level legs of chairs and tables.
To replace casters in articles of furniture.
To repair drawers that stick.
To reupholster chairs and couches.
To repair window screens.
To repair toys.
To reseat chairs.
To adjust an extension table which sticks.
To repair roller shades.
To fit up a work bench.
To acquire the habit of keeping and using repair equipment.
To select an appropriate brush for painting, clothing, shoes, teeth, shaving, and scrubbing.
To distinguish vegetable from animal bristles.
To know the relative value of pyroxylin and bone brush backs.
To distinguish pyroxylin from ivory backs in brushes.
To strengthen a broom by metal bands, wire, and old stockings.

5. Care of a House

To mix paints in the home.
To prepare the surface of wood, iron, plaster, and brick for painting and for repainting.
To treat nail holes and cracks before painting.
To mix colors to get the desired tint.
To mix and apply the first, second, and third coats of paint properly.
To apply varnish.
To clean paint brushes.
To care for paint brushes when they are not in use.
To prepare whitewash and calcimine.
To thin paints.
To add driers.
To repair loose plaster.
To repair cracks in the wall.
To cement cracks in concrete basements and loose joints in brick, stone, and tile.
To seal openings in woodwork and breaks in drain pipes.
To repair breaks in concrete walks and steps.
To construct walks, floors, steps, driveways, fence posts, and foundations.
To make concrete by mixing cement, sand, and gravel in proper proportion.
To construct forms for concrete work and to use mixing board, rake, and spade in this work.
To cut glass.
To remove old putty.
To make and apply putty.
To put in a new window glass.
To repair broken window cords.
To install a sewage system.
To construct and care for a cesspool.
To prevent contamination of water by sewage.
To repair a leaky faucet.
To stop a leak in a pipe.
To repair a leak in a pipe by soldering.
To clean a trap.
To replace a wornout washer in a faucet.
To shut off water in case of a leak.

To prevent freezing of pipes by draining them or by applying heat.
To thaw out a frozen pipe.
To improvise a shower bath.
To keep a flush tank in order.
To be familiar with the details of a drainage system in a house.
To clean the following with minimum labor and maximum results: walls, ceilings, woodwork, furniture, windows, floors, carpets, rugs, linoleum, matting, mirrors, refrigerators, cupboards, gas ranges, beds, copper, brass, silver, aluminum, nickel, earthenware, enamel ware, china, stoves, waxed wood, varnished wood, oiled wood, painted wood, burlap walls.
To remove paint from woodwork and enamel.
To use disinfectants and antiseptics.
To exterminate ants, bedbugs, cockroaches, flies, rats, and mice.
To dispose of waste, garbage, and ashes.
To use and to keep properly the following cleaning tools: brooms, brushes, mops, vacuum cleaner, carpet sweeper, oil mop, mop wringer, and polishing cloth.

6. *Miscellaneous Household Skills*

To use color, trees, shrubs, vines, and plants for exterior decoration.
To select appropriate color for the kitchen, dining room, and children's room.
To use color to beautify furniture, flower boxes, curtains, and woodwork.
To use stencils in decorating the home.
To select and hang pictures and picture frames which increase the beauty of a home.
To use color to create the psychological effects of distance, nearness, warmth, and gayety.
To select appropriate wall paper.
To purchase proper seed in proper amounts.
To prepare the soil for planting.
To plant the seed.
To cultivate the soil.
To weed a garden.
To know the nature and habits of the plants commonly grown.
To water a garden.
To apply fertilizer.

To start early vegetables in a seed box.
To use a gardener's planting table.
To use the following tools efficiently: spade or garden fork, hoe, steel-tooth rake, trowel, watering can or hose, line, stakes, and hand cultivator.
To repair a door knob.
To put on a hinge.
To repair household utensils by soldering.
To sharpen knives, scissors, and tools.
To clean a clock.
To mend the frame of an umbrella.
To repair simple locks.
To grease bags with vaseline to prevent them from drying out.
To mend torn leather.
To use discarded leather articles.
To repair broken china and glass.
To mend rubber articles.
To keep a reproducer and motor in good order.
To construct double-decker beds, hanging beds, and the like, when there is overcrowding in the home.
To make a window shield.
To make screens or portières for privacy in a sleeping room.
To construct a collapsible or hanging table to increase room space.

7. *Fuels, Lighting, and Heating*

To know the chief household fuels and where they are used.
To know the relative fuel value of the chief woods in a locality.
To give special attention to the application of electricity as a fuel in regions where water power is abundant, as in the western states.
To know the cost of electricity in one locality in relation to the cost in other parts of the country.
To know the relative importance of the chief household fuels.
To become aware of the relation of coal to gas, and of both to electricity.
To know the relative brightness of the chief illuminants.
To know the relative power of illuminants to approximate daylight.
To know the value of several electric outlets in walls and floors.
To use table and wall lamps.
To buy tungsten incandescent lamps in preference to carbon and gem lamps.

To use a gas mantle and never to burn a flat flame.
To use a kerosene mantle lamp.
To purchase ramie and artificial silk mantles in preference to cotton mantles.
To use shades and reflectors for gas and electric lights.
To select shades and reflectors which hide the glare of a lamp, which diffuse the light, and which have a high capacity to reflect light.
To use colored shades only for decoration.
To select wall and ceiling colors which have the highest power to reflect light.
To know the relative coefficients of reflection of the chief white and colored pigments.
To know the relative cost of lighting materials in one's local community.
To get adequate illumination.
To adjust lamps so that no direct light falls on a person.
To know the most comfortable room temperature.
To own and to use a thermometer habitually.
To avoid overheating a room.
To know how to humidify the air.
To know the relative value of the several varieties of heating systems and their most appropriate uses.
To know the relative cost of installing the several heating systems.
To know the relative cost of maintaining the several heating systems.
To know that use of gas for continuous heating is wasteful.
To use gas for intermittent hot-water supply.
To know the relative cost of fuels in any locality.
To utilize the results of experiments in economic and effective use of fuels.
To know the relative efficiency of the chief heating apparatus.
To know the relative heat value of the chief fuels.
To calculate the actual cost of fuel for heating.
To make rough tests of fuel economy in the home.
To purchase coal by the ton.
To avoid using electricity except for lighting.
To test electric and gas meters when a leak is suspected.
To become acquainted with the chief articles of electrical equipment.
To ascertain the economy and other advantages of using new articles of electrical equipment.

To know how to purchase lamps, fuses, plugs, sockets, wiring, electric irons, vacuum cleaners, and toasters.
To select an electric vacuum cleaner on the basis of current consumption as well as design.
To know the varieties of the chief electric fixtures.
To test electric lamps by keeping records of service.
To know the size of a fuse necessary to prevent overloading the wires.
To prevent a short circuit.
To use an electric motor to supply power for sundry household purposes.

8. *Fuel Skills*

To repair a leak in a gas pipe.
To use the proper pressure in burning gas.
To adjust the spud to the pressure used.
To adjust the gas burner to get maximum light or heat.
To manipulate the air shutter, spud, and burner to get the right mixture of air and gas.
To take proper care of mantles by guarding against drafts, vibrations, and dust; by keeping mantle chimneys clean; and by replacing broken chimneys.
To adjust shades and reflectors properly to prevent glare and to give maximum illumination.
To clear a carboned mantle.
To arrange the light units, when possible, according to use of light in the home.
To fire a stove or furnace properly by keeping an even bed over the entire grate, by firing lightly and frequently, by keeping the ash pit clean.
To save fuel by periodically removing soot from heating surfaces.
To use dampers properly.
To line hot-water pipes with asbestos or other insulating material.
To keep a stove in good repair.
To retain the heat of a cook stove by surrounding it with a screen.
To keep the heat within a room by the use of weather strips and storm sashes.
To use the coal door and ash-pit door properly.
To manipulate the slides in the coal and ash-pit doors to increase or check the fire.
To fire a stove economically.

To use skins of vegetables as fuels.
To care for the boiler.
To fill the boiler.
To humidify the air.
To use a switch.
To put in a new fuse.
To use a fuse of the right amperage.
To prevent overloading the wires.
To repair a socket.
To install an extension wire.
To install an electric bell or buzzer.
To read an electric meter.

Social Studies — Consumers' Problems

1. *Consumption of Food*

To know that wheat, dairy products, beef, and pork are the great sources of protein.
To know that wheat, sugars, corn, potatoes, and dairy products furnish nine-tenths of all the carbohydrates.
To know that pork, dairy products, vegetable oils, and beef furnish nearly nine-tenths of all the fat intake.
To know that nine-tenths of the total nutrition of the nation is derived from wheat, corn, pork, beef, the dairy products, poultry, eggs, potatoes, and vegetable oils.
To cultivate the attitude that the health of the nation is dependent upon an adequate income to supply the minimum energy requirements of man.
To know the relation of raw milk to evaporated milk, condensed milk, and ice cream.
To become aware of the unusually excessive per capita consumption of meat in the United States.
To know that the total food bill increases as the expenditure for meat increases.
To know that the greater the expenditure for meat in the diet, the less is its total nutritive value.
To give the vegetables their proper place in the thinking and habits of the food plan of the people of our nation.
To know the effect of home and commercial canning on beans, peas, and tomatoes.

To know exactly what place the fruits occupy in the food plan.
To know the relation between fresh and canned fruits as well as their comparative quality and economy.
To know the relative value and economy of the several cereals and cereal products.
To buy in large quantities foods which can be stored, such as: sugar, potatoes, flour, cereals, dried fruit, dried vegetables, canned fruit and vegetables, cocoa, coffee, condensed milk, and lard.
To buy goods through buying clubs.
To ascertain the difference in wholesale and retail prices of the chief food commodities.
To ascertain what the actual difference is between food bought in bulk and food bought in packages.
To know the federal law establishing a standard barrel for fruits and vegetables, and a standard basket for small fruits.
To know that all food packages are required by law to be marked with the net contents.
To ascertain what fruits, vegetables, and other food products vary in price with the seasons.
To buy a substitute for an article when its price changes suddenly.
To know that delivery and credit are services which are paid for by increased cost.
To ascertain the saving incurred by purchasing at cash-and-carry stores.
To become aware of the problem of marketing as it affects the consumer with respect to quality and price of food products.
To be prepared to act politically on marketing issues.
To become familiar with the advantages and disadvantages of municipal markets.
To compare the quality and price of food commodities bought at public markets and at retail stores.
To ascertain the advantages, if any, of buying food products directly from farmers by trucks, express, or parcel post.
To ascertain the advantages, if any, of coöperative buying.
To become familiar with the plan of the coöperative movement.
To know the effect of supply, storage, and shipment upon the price of food in a particular community.
To urge the publication of thorough and complete market prices by the government and in newspapers.

To interpret existing market reports intelligently and to use them in connection with food purchase.

To know the chief sources of the important foods in any community and their bearing upon quality and price.

To purchase foods for their intrinsic worth.

To discover whether one's food habits are based on custom rather than on economy and health.

To help the immigrant adjust himself to an American diet.

To ascertain the extent of saving which results from home cooking.

To increase the consumption of cheap foods by especially learning to prepare and cook them in a palatable way. These are: cheese, vegetables, fruits, legumes, fish, oatmeal, corn, barley, and cocoa.

To consume all the edible food which is purchased.

To determine whether electric cooking is economical.

To test the relative cost of fuels for cooking.

2. *Housing, Home Ownership, and Rent*

To get an accurate concept of the typical American dwelling.

To keep fresh in the minds of the people the housing achievements of our government during the war.

To instill an interest in housing as a fundamental element of progress.

To guard the American tradition that the house is the dwelling place of one family.

To know the fundamental elements which determine the quality of a home.

To understand the significance of rent, number of rooms, water supply, bathtubs, ventilation, and home ownership as elements of the housing problem.

To make a housing standard a part of the mental habits of the people of our nation, — and to have that standard include the following elements: rent, type of house, number of rooms, toilet, bath, gas for heating, ventilation, closet space, storage space, running water, lighting, drainage, laundry, and washtubs.

To use these standards in the purchase and selection of a house.

To know how to report illegal housing conditions to the proper government authority.

To know the cost of the chief types of dwellings.

To create an interest in ascertaining the relative advantages of owned and rented homes.

To understand and apply the very significant relation between income and home ownership.
To know the minimum income necessary for the purchase of a home on a part-payment plan.
To consider and to do something about making conditions of wages and production conducive to home ownership.
To demonstrate that home ownership improves living conditions, including condition of repair and congestion.
To know that the single-family dwelling is in a measure dependent upon home ownership.
To ascertain accurately how permanent one's position is before purchasing a home.
To ascertain the possibility of disposing of a home when one's position is uncertain.
To become acquainted with the opportunities offered by the Building and Loan Associations with a view to becoming a member.
To consider the possibility of government aid in purchasing homes for the low-income families.
To become familiar with the provisions of the Federal Building Loan Act.
To evaluate the results of government aid in England, France, Canada, and other countries in Europe and Australia.
To know the housing conditions of industrially owned homes and communities.
To determine whether industrially controlled communities conform to American political policy.
To become familiar with Housing and Financing Companies as an aid to purchasing a home.
To learn what opportunities the life insurance companies offer for lending money for construction of homes.
To ascertain the advantages and disadvantages of coöperative housing.
To learn the technique of being a coöperative tenant or owner.
To consider the building guild as an aid to promoting home ownership.
To know the details of law and taxation connected with home ownership.
To become familiar with the housing standards set by law.
To provide and care for play space for children.
To obtain facilities for bathing when not provided in the home.
To understand thoroughly the effect of congestion on health, comfort, and morals.
To know the more important provisions of the housing code.

To discourage remodeling tenement houses built before the new housing law came into effect.

To keep one's apartment in good repair and to demand that the house be kept in good repair.

To incorporate into the thinking of the people that to have less rooms than at the rate of one person per room is overcrowding.

To know the extent of overcrowding at present.

To increase that portion of the budget spent for rent to such a point as will meet the standard of one room per person.

To use one's influence, by collective opinion, to improve the standard of house planning.

To know what factors make high or low rent. To detect profiteering.

To know how to ascertain the cost of materials, cost of labor, interest rates, and taxes.

To ascertain the relation between rent and a standard home.

To increase the item of rent in the budget to a maximum degree consistent with the total needs of life.

To know what per cent of the investment is a fair rental.

To think sanely and honestly about the facts and remedies concerning the rent problem, as well as to gather these facts.

To ascertain in public records the investment on a house; that is, the assessed value of the land and of the house.

To know the main items of expense which determine rent.

To know whether one's rent is paid chiefly for location or for other advantages.

To know that part of the rent for which taxes are responsible.

To know when the claim that taxes are the cause of increase in rent is justifiable.

To adjust the budget so as to reduce food costs and to apportion enough money for rent to make it possible to secure a standard home.

To know that the housing shortage is a social and political problem.

To cultivate habitual thinking about the problem of housing shortage in order to help work out a solution or to act intelligently upon a proposed solution.

To become acquainted with present measures designed to reduce the shortage of houses.

To know the chief raw materials of building construction and repair.

To know the relative importance of brick, steel, lumber, and plumbing and heating materials in building construction.

3. *Furniture, Fuels, etc.*

To know the common woods which enter into the furniture of the nation, namely: oak, sap gum, red gum, maple, birch, chestnut, and poplar.

To know the relative cost of the chief furniture woods.

To avoid being misled by furniture advertisements.

To know the relative value of cowhide, calfskin, goatskin, sheepskin, horsehide, and pigskin.

To know the chief household fuels and where they are used.

To give special attention to application of electricity as a fuel in regions where water power is abundant, as in the western states.

To know the relative importance of the chief household fuels.

To build up a habit of mind in support of fuel conservation and preservation.

To learn that the supply of coal is limited.

To create public opinion which will enforce the conservation of natural gas.

To learn that the petroleum reserves will last no more than twenty years.

4. *Clothing*

To know the effect of cheap, tawdry, torn, ill-fitting, and ill-kept clothing on social relations.

To consume clothing for its intrinsic worth rather than for display.

To differentiate between expensiveness and real worth in clothing.

To understand the nature of fashions in clothing.

To know how fashions are created.

To ascertain the relation of fashions to the clothing needs of the mass of people.

To know the effect of fashions on individual choice of clothing.

To know the effect of fashions on the economics of the clothing industry.

To know the effect of staple fabrics and novelty fabrics on price.

To know the chief articles of clothing consumed by the people of the United States and the significance of these items in our industrial life.

To observe objectively the clothing habits of the people of our nation.

To become familiar with approved standards of clothing consumption.

To use the facts revealed by clothing standards to form opinions on wages, production, and other economic problems.

To buy the best quality of clothing consistent with the income of a family.
To consider solutions to the condition in our economic plan which makes it impossible for a great body of the people of our nation to dress adequately.
To adjust the family expenditure to make it possible to buy more and better clothes.
To understand the power of clothing intelligence to help overcome some of the disadvantages of an inadequate income.
To know the chief raw materials which enter into wool garments and their effect upon the quality of clothing.
To know the effect of the tariff laws on the quality and price of wool.
To know the effect of styles on women's clothing.
To buy clothing of better quality.
To order the budget so as to make possible the purchase of more durable garments.
To buy suits of better quality.
To know the effect of style on men's clothing.
To know the place of shoes in the budget.
To be acquainted in a general way with the cost of manufacture of shoes.
To purchase hats without being influenced by style.
To know the effect of style on the cost of women's underwear.
To know the importance of men's furnishings in the budget.
To know the relative importance of the textile furnishings in the budget.
To know roughly the relative cost of home-made and ready-made garments of the several easily made in the home.

The Consumer's Arithmetic

1. *Food Measurement and Calculation*

To check up the cost of bread when bought by the package.
To know the loss of money in purchasing sugar in small cartons.
To ascertain the difference in cost between fresh and canned goods.
To compare the quality and price of food commodities bought at public markets and at retail stores.
To ascertain the extent of saving which results from home cooking.
To add, subtract, multiply, and divide, using the common quantities of milk, meat, butter, eggs, fruits, and potatoes.

To keep accounts of expenditure.
To convert the pound, quart, and dozen into smaller units and to use these measures in simple calculations.
To use the simple fractions in converting the pound, quart, and dozen to smaller units.
To calculate the cost of a fraction of a pound, quart, a dozen, when the cost of a unit is known.
To ascertain the fraction of a unit received, when a purchase is made by money instead of by weight.
To set down in bill form a large purchase order, for the purpose of checking it.
To check up a bill.
To weigh and measure purchased articles accurately.
To read a glass graduate.
To obtain a result as a fraction or per cent, when a comparison of cost or quantity is made.
To read tables showing nutritive value of food commodities.
To calculate how much can be saved by a change in the diet.
To calculate the amount of nutritive elements consumed and to make comparison with standards.
To read recipes accurately.
To know the table of equivalent weights and measures of the spoon and cup.
To perform the calculations necessary to increase or decrease the ingredients prescribed in a recipe.
To read the gas and electric meter.
To test the amount of gas used at different times.
To perform the simple operations necessary to convert weights and measures into terms of money, in making the food budget.
To discover leaks in the budget by making percentile comparisons of group with group, and of month with month, and of year with year.
To calculate the per cent which groups of commodities are of the entire budget.
To increase or decrease the budget in proportion to the increase or decrease in the income.
To read the tables of retail and wholesale market prices in newspapers and magazines.
To calculate the amount needed in a given time when a large quantity is purchased.

To ascertain the amount saved by a large-quantity purchase.
To use the ton, cord, or kilowatt hour in fuel calculations.

2. *Household Measurement and Calculation*

To calculate the dividend of a member of a coöperative store.
To know that part of the rent for which taxes are responsible.
To calculate the probable cost of good ready-mixed paints from the market price of the ingredients.
To select appropriate brushes for painting, clothing, shoes, teeth, shaving, and scrubbing.
To distinguish vegetable from animal bristles.
To know the relative value of pyroxylin and bone brush backs.
To distinguish pyroxylin from ivory backs in brushes.
To strengthen a broom by metal bands, wire, and old stockings.
To use the board foot in measuring lumber.
To use a carpenter's rule.
To use the liquid measure in measuring paint, varnish, cleansing preparations, and gasoline.
To use avoirdupois measure in connection with hardware, pigment, cleaning preparations, ice, putty, and paper.
To use the measure of a barrel in connection with lime and cement.
To use linear measure in measuring land, lumber, furniture, carpets, rugs, glass, upholstery, and linoleum.
To use cubic measure in connection with sewage problems.
To use the dozen in connection with the purchase of hardware.
To use circular measure in decorative tasks.
To use the inch, foot, yard; ounce, pound; pint, quart, gallon; second, minute, hour, day, month; barrel; degree; quire and ream, in calculations connected with the purchase and use of household materials.
To keep accounts of the cost of autos, furniture, and phonographs bought on a part-payment plan; of the cost of maintenance of a house; of checks paid out; of telephone calls; of maintaining an auto; and of maintaining a garden.
To use decimals, percentage, and interest in calculations involving formulæ for paint and cleansing preparations; the relative expenditure for household articles and rent in the budget; the per cent increase of rent; the per cent shortage in delivery; interest on loans, notes, and real estate; and interest on long-time payments for furniture, autos, and phonographs.

To make calculations in determining a fair rental.
To calculate the effect of an increase of taxes upon rent.
To calculate one's tax bill.
To read estimates of construction and repair.
To understand mortgage plans and amortization plans.
To check up the contents of a container.
To compare the cost of articles put up in containers by two or more concerns.
To use the following measuring instruments skillfully: rule, measuring tape, liquid measures, graduate, clock, and thermometer.
To use calculations in connection with the construction and repair of furniture, buildings, concrete articles, upholstery, and plumbing.
To make and use a working drawing.
To use fractions in calculations involving lumber, furniture, hardware, paint, varnish, cleaning preparations, carpets and rugs, glass, upholstery materials, gardening, and linoleum.
To use money in calculations involving household articles and rent.

3. *Fuel Measurement and Calculation*

To use the following units in calculation: ton, hundredweight, pound, cord, gallon, quart, pint, barrel, kilowatt hour, watt hour, ampere, volt, watt, degree, British Thermal Unit.
To perform the numerical operations of addition, multiplication, subtraction, and division, involving the units used in fuel calculations.
To calculate the relative cost of fuels when the heat value of the fuel, the efficiency of the apparatus, and the cost of the fuel are known.
To know the sources of data giving the heat value of fuels, the efficiency of apparatus, and the cost of fuel.
To compare the meter readings of gas consumed in two or more alternative appliances.
To habitually check up the company inspector's reading of the gas meter.
To check up the loss in purchasing coal, wood, and kerosene in small units.
To read an electric meter.
To read a thermometer.
To calculate the amount of kilowatt hours of current used when the wattage of the lamp and the time it was burned are known.

To calculate the amount of current which flows through a circuit when lamps of high wattage, toasters, electric irons, and vacuum cleaners are used. To compare this figure with the number of amperes recorded on the fuse.

4. *Clothing Measurement and Calculation*

To use long measure in calculation.
To use United States money in calculation.
To use $\frac{1}{3}$, $\frac{1}{4}$, and $\frac{1}{8}$ in calculation.
To multiply a whole number by a fraction.
To reduce inches to yards and *vice versa*.
To use a tape measure.
To interpret the measures on labels of pillow slips.

Science for the Consumer

1. *Food*

To know the function of protein, fats, carbohydrates, calcium, iron, and phosphorus in the diet.
To know the function of the mineral salts in the diet.
To know the foods that are rich in protein, carbohydrates, calcium, phosphorus, and iron.
To know the constituents of oleomargarine and its relation to butter as a food.
To draw upon milk especially as a source of calcium.
To know that milk contains all the important nutrients required by man.
To know the relation of milk to butter and to cheese.
To correct the impression that cheese is difficult to digest.
To know the relation of raw milk to evaporated milk, condensed milk, and ice cream.
To use and to think of the green vegetables primarily as foods rich in calcium, phosphorus, and iron salts.
To use and think of the legumes as rich in protein foods, with an abundance of calcium and iron.
To know exactly what place the fruits occupy in the food plan.
To know the special value of oatmeal as a carbohydrate and protein food.
To test the relative cost of fuels for cooking.
To know the relative value of ironware, tin-plated ware, aluminum, and enamel ware.

2. *Housing, Building Materials, etc.*

To install proper lighting apparatus to offset the effect of dark rooms.
To be specially trained in matters of ventilation.
To use deodorizers.
To choose lumber with one's builder or carpenter.
To know the common woods used in building construction and their appropriate uses.
To know the relative durability of woods used in building construction.
To identify yellow pine, Douglas fir, western yellow pine, hemlock, spruce, cypress, and redwood.
To know the most suitable wood for light framing, beams and girders, siding and exterior finish, roof boards and sub-floors, shingles, flooring, doors, window frames, interior finish, cupboards, draining boards, and shelves.
To know that hardwoods warp more readily than softwoods.
To identify earthen and porcelain sanitary ware and to know their appropriate uses.
To keep a continuous stock of lime and to use it as fertilizer, disinfectant, deodorizer, insecticide, and in making mortar and plaster.
To recognize window glass and plate glass and to know their relative values.
To distinguish birch from mahogany.
To distinguish gumwood from walnut.
To identify a veneer.
To identify the print of quartered oak on cheaper woods.
To know the relative durability of the chief furniture woods.
To learn that paint is a protective and sanitary product.
To distinguish paint, stain, varnish, and enamel.
To know the common ingredients of paint and varnish.
To become familiar with the sources of formulæ for paint and varnish.
To identify linseed oil.
To know the relative value of the four white pigments.
To become familiar with the thinners, turpentine and benzol.
To become familiar with lead and manganese driers.
To select the proper white pigment for maximum illumination.
To know the illuminating quality of the common interior colors.
To select paint for indoor and outdoor purposes properly.
To distinguish cast-iron, malleable cast-iron, and steel, the metals of which tools are commonly made.

To know the relative durability of cast-iron, wrought-iron, malleable cast-iron, and steel.
To select brass or bronze for door knobs, hinges, window catches, plumbing fittings, and bathroom fittings.
To know the chief materials which enter into paper products.
To know the relative durability of common papers.
To identify cowhide, calfskin, and sheepskin used in bags, cases, and upholstery.
To identify the grain seal, walrus, alligator, and pigskin.
To distinguish grain from split leather.
To know the relative value of cowhide, calfskin, goatskin, sheepskin, horsehide, and pigskin.
To identify the following leather finishes: suède, morocco, Cordovan, levant, and enamel.
To identify imitation leather.
To know the merits and defects of wool-fiber rugs.
To know the merits of the all-fiber rugs.

3. *Cleansing and Polishing Preparations*

To select a good laundry soap.
To select a good toilet soap.
To know the chief raw materials which enter into soap.
To check up and identify, when possible, the basic fat or oil in soaps.
To know the relative cleansing quality of the several kinds of soaps.
To distinguish hard and soft soap and to know their appropriate uses.
To select an appropriate soap for hard water.
To purchase soap which is not adulterated.
To identify and select appropriate medicated soap.
To know the chemicals used in cleansing and polishing preparations and to know the dangers connected with their use.
To ascertain the advantages of newly discovered preparations.
To make the cleansing and polishing preparations which consist of simple solutions sold under trade names.
To know the appropriate cleansing and polishing preparations to use for walls, ceilings, wood surfaces, floor coverings, windows, mirrors, copper, brass, nickel, earthenware, iron, enameled ware, stove, floors, and furniture.
To know the chief ingredients of metal polishes and paste polishes.

To guard against preparations which injure metals.
To know and identify the common grease solvents: benzol, alcohol, turpentine, benzine, gasoline, chloroform, and carbon tetrachloride.
To know which are inflammable.
To purchase the common disinfectants in the chemical form, as formaldehyde, carbolic acid, creosote, pine oil, bleaching powder, and bichloride of mercury.
To identify some common cleansers and polishes, such as borax, sodium carbonate, caustic potash, caustic soda, lye, camphor, and sulphur.

4. *Miscellaneous Household Articles*

To distinguish glue, mucilage, paste, and cement.
To select appropriate adhesive materials in woodwork, and in the repair of furniture, leather, china, rubber, and paper articles.
To select specially prepared water-resisting glue for articles of wood which are exposed to moisture.
To identify a good motor.
To know the construction of a reproducer and to select a satisfactory one.
To know the relative merits of jeweled point, semi-permanent, steel, and wood needles.
To select tires according to durability and cost.
To avoid unnecessarily rich mixtures.
To use carburetor and manifold equipment which give greatest fuel economy.
To keep a car in good repair.
To know the important accessories and their special advantages.
To select appropriate brushes for painting, clothing, shoes, teeth, shaving, and scrubbing.
To distinguish vegetable from animal bristles.
To know the relative value of pyroxylin and bone brush backs.
To distinguish pyroxylin from ivory backs in brushes.

5. *Household Skills*

To mix colors to get the desired tint.
To clean paint brushes.
To prepare whitewash and calcimine.
To thin paints.
To add driers.

To install a sewage system.
To construct and care for a cesspool.
To prevent contamination of water by sewage.
To repair a leak in a pipe by soldering.
To prevent freezing of pipes by draining them or by applying heat.
To thaw out a frozen pipe.
To be familiar with the details of a drainage system in a house.
To clean the following with minimum labor and maximum results: walls, ceilings, woodwork, furniture, windows, floors, carpets, rugs, linoleum, matting, mirrors, refrigerators, cupboards, gas ranges, beds, copper, brass, silver, aluminum, nickel, earthenware, enamel ware, china, stoves, waxed wood, varnished wood, oiled wood, painted wood, burlap walls.
To use disinfectants and antiseptics.
To exterminate ants, bedbugs, cockroaches, flies, rats, and mice.
To use color, trees, shrubs, vines, and plants for exterior decoration.
To select appropriate color for the kitchen, dining room, and children's room.
To use color to beautify furniture, flower boxes, curtains, and woodwork.
To use color to create the psychological effects of distance, nearness, warmth, and gayety.
To know the nature and habits of the plants commonly grown.
To apply fertilizer.
To grease bags with vaseline to prevent them from drying out.
To mend rubber articles.
To keep a reproducer and motor in good order.
To make a window shield.
To avoid contact with the salts of lead and mercury in the use of paint.
To guard against the effect of methyl alcohol on the eyes in the use of shellac and varnish.
To guard against the poisonous and corrosive effect of oxalic acid in the use of shoe polish, metal polish, straw-hat cleaning fluid.
To guard against the effect of caustic alkalies on the sensitive membranes.
To avoid irritation of the sensitive membranes in the use of concentrated ammonia.
To guard against the poisonous effects of corrosive sublimate and carbolic acid present in antiseptics.

6. *Fuels, Lighting, and Heating*

To know the relative importance of the chief household fuels.
To become aware of the relation of coal to gas, and of both to electricity.
To know the relative fuel value of the chief woods in a locality.
To give special attention to application of electricity as a fuel in regions where water power is abundant, as in the western states.
To know the relative brightness of the chief illuminants.
To buy tungsten incandescent lamps in preference to carbon and gem lamps.
To use a gas mantle and never to burn a flat flame.
To purchase ramie and artificial-silk mantles in preference to cotton mantles.
To use shades and reflectors for gas and electric lights.
To select shades and reflectors which hide the glare of a lamp, which diffuse the light, and which have a high capacity to reflect light.
To select wall and ceiling colors which have the highest power to reflect light.
To know the relative coefficients of reflection of the chief white and colored pigments.
To get adequate illumination.
To know the most comfortable room temperature.
To own and to use a thermometer habitually.
To avoid overheating a room.
To know how to humidify the air.
To know the relative value of the several varieties of heating systems and their most appropriate uses.
To utilize the results of experiments in economic and effective use of fuels.
To know the relative efficiency of the chief heating apparatus.
To know the relative heat value of the chief fuels.
To calculate the actual cost of fuel for heating.
To learn of the possibility of generating electricity by water power.
To test electric and gas meters when a leak is suspected.
To become acquainted with the chief articles of electrical equipment.
To ascertain the economy and other advantages of using new articles of electrical equipment.
To know how to purchase lamps, fuses, plugs, sockets, wiring, electric irons, vacuum cleaners, and toasters.
To select an electric vacuum cleaner on the basis of current consumption as well as design.

To know the meaning of a watt, volt, and ampere.
To know the size of a fuse necessary to prevent overloading the wires.
To prevent a short circuit.
To use an electric motor to supply power for sundry household purposes.
To reduce loss by fire due to ignorance of the use of electrical apparatus.
To avoid electric shocks and burns.
To prevent asphyxiation, explosions, and leaks.
To own and to use a fire extinguisher.
To treat a person whose clothes are on fire.
To use blankets, water, sand, and earth in extinguishing fires.

7. *Fuel Skills*

To use the proper pressure in burning gas.
To adjust the spud to the pressure used.
To adjust the gas burner to get maximum light or heat.
To manipulate the air shutter, spud, and burner to get the right mixture of air and gas.
To arrange the light units, when possible, according to use of light in the home.
To line hot-water pipes with asbestos or other insulating material.
To keep a stove in good repair.
To retain the heat of a cookstove by surrounding it with a screen.
To manipulate the slides in the coal and ash-pit doors to increase or check the fire.
To humidify the air.
To put in a new fuse.
To use a fuse of the right amperage.
To prevent overloading the wires.
To install an electric bell or buzzer.
To read an electric meter.
To calculate the amount of kilowatt hours of current used when the wattage of the lamp and the time it was burned are known.

8. *Clothing*

To know the relative capacity of the chief clothing fabrics to withstand the cold.
To know the effect of absorption and evaporation on health and comfort
To know the relative capacity of the chief clothing fabrics to absorb and evaporate moisture.

To know the effect of artificial light on the color of fabrics and to practice the use of this knowledge in clothing purchases.
To identify cotton treated with glycerin, starch, mucilage, gum, or china clay.
To identify and know the value of mercerized cotton.
To know and identify silks weighted with metal salts.
To know the special characteristics of linen as a clothing material.
To know the laundering properties of linen.
To know the effect of dyes on linen.
To know the uses for which linen is especially adaptable.
To recognize linen that is sized or finished with starch, glue, or gum.
To distinguish the expensive group of furs from the inexpensive group.
To know and identify the chief skins consumed by the American people.
To know that sunshine, heat, and oil attack rubber fabrics.
To know the technical names of the various parts of the shoe.
To know how each part affects the quality, cost, and comfort of the shoe.
To know the chief kinds of leather which go into the upper of a shoe; to know their relative merits and cost.
To fit a shoe properly.
To know the structure of the foot and the relation of the shoe to this structure.
To know the effect of high heels and tight shoes upon health.
To remove spots and stains of grease, ink, food, and paint.
To launder clothing.
To know the effect of different soaps on clothing.
To know the effect of soap on the several textile fabrics.
To know the effect of temperature on the several textile fabrics.
To store clothing between seasons.
To store clothing when not in use.
To use special devices to conserve clothing.
To know the effect of living organisms on clothing.
To store furs.
To know the effect of weather on clothing.

The Consumer's Health

1. *Food Consumption*

To know the function of protein, fats, carbohydrates, calcium, iron, and phosphorus in the diet.
To know the function of the mineral salts in the diet.

To select food with an eye to its dietary functions.
To assure the presence in every meal of: (1) fruits and vegetables (2) protein foods, (3) cereals and starchy foods, (4) fatty foods.
To guard against the overconsumption of fats.
To guard against the overconsumption of proteins, particularly in th form of meat.
To consume a sufficient quantity of milk, vegetables, and fruits.
To consume a sufficient quantity of calcium and iron in foods.
To form the habit of drinking milk daily.
To know the nutrient value of milk.
To use butter or a butter substitute with every meal.
To consume more milk in the raw form.
To know that milk contains all the important nutrients required by man
To know the function of pork, beef, mutton, lamb, and veal in the diet
To know that coffee and tea contribute nothing to nutrition.
To consume proper food when suffering from colds, sore throat, headache indigestion, constipation, and dysmenorrhea.
To feed properly those suffering from the above ailments.
To feed the infant properly.
To acquire clean and orderly table practices.

2. *Housing*

To obtain facilities for bathing when not provided in the home.
To understand thoroughly the effect of congestion on health, comfort and morals.
To maintain cleanliness in the halls of the house.
To incorporate into the thinking of the people that to have less rooms tha at the rate of one person per room is overcrowding.
To rent one sleeping room per person.
To inform inhabitants of homes without baths how they can purchas or construct and use sanitary appliances.
To know the standard number of windows per home.
To cultivate the habit of keeping rooms aired properly.
To know the relation between dust and open windows.
To know that cool surroundings stimulate work and to cultivate th habit of keeping a house cool.
To know the relation between a stagnant room and appetite.
To know the relation between stagnancy and comfortable temperatur of a room, and to keep the room at that temperature.

To cultivate the habit of using a thermometer.
To know that a high temperature reduces the appetite.
To avoid drafts.
To use devices such as electric fans to keep air in circulation.
To learn that paint is a protective and sanitary product.
To identify and select appropriate medicated soap.
To construct and care for a cesspool.
To prevent contamination of water by sewage.
To improvise a shower bath.
To use disinfectants and antiseptics.
To exterminate ants, bedbugs, cockroaches, flies, rats, and mice.
To dispose of waste, garbage, and ashes.
To use and to keep properly the following cleaning tools: brooms, brushes, mop, vacuum cleaner, carpet sweeper, oil mop, mop wringer, and polishing cloth.

3. *Clothing*

To purchase raincoats, rubbers, gloves, and underwear with special emphasis on their hygienic value.
To know the relative capacity of the chief clothing fabrics to withstand the cold.
To know the effect of the number of layers of clothing on warmth.
To know the effect of red goods on warmth.
To know the effect of color on warmth.
To know the effect of absorption and evaporation on health and comfort.
To know the relative capacity of the chief clothing fabrics to absorb and evaporate moisture.
To know the relation of free movement of the body to clothing selection.
To know the relation between clothing selection and the weight of garments.
To select special garments to wear for rain, snow, cold weather, hot weather, damp weather, and windy weather.
To form habits of change of underwear, handkerchiefs, towels, stockings, etc., which meet the best hygienic requirements.
To know the effects of laundering on comfort and cleanliness.
To know the technical names of the various parts of the shoe.
To know how each part affects the quality, cost, and comfort of the shoe.
To fit a shoe properly.

To know the structure of the foot and the relation of the shoe to this structure.
To know the effect of high heels and tight shoes upon health.

Household Safety

To keep fire escapes free from encumbrance.
To avoid contact with the salts of lead and mercury in the use of paint.
To guard against the effect of methyl alcohol on the eyes in the use of shellac and varnish.
To guard against the poisonous and corrosive effect of oxalic acid in the use of shoe polish, metal polish, straw-hat cleaning fluid.
To guard against the effect of caustic alkalies on the sensitive membranes.
To avoid irritation of the sensitive membranes in the use of concentrated ammonia.
To guard against the poisonous effects of corrosive sublimate and carbolic acid present in antiseptics.
To reduce loss by fire due to ignorance of the use of electrical apparatus, matches, defective chimneys and flues.
To avoid electric shocks and burns.
To learn to use fuses and switches properly.
To treat shock and burns.
To prevent asphyxiation, explosions, and leaks.
To stop a gas leak.
To treat for asphyxiation.
To prevent accident in handling heating pads and electric toys.
To own and to use a fire extinguisher.
To treat a person whose clothes are on fire.
To make one's way through smoke.
To use blankets, water, sand, and earth in extinguishing fires.

BIBLIOGRAPHY

This bibliography conforms to the usual standards of library practice. In calling in a library for a book or article here listed, the reader should give all the information under each title. If in doubt, he should consult the librarian. It is always wiser to give too much information rather than too little.

I. General Indexes and Bibliographies

Agricultural Index. Subject index to a selected list of agriculture periodicals, books, and bulletins.

Card catalogue of the New York Public Library or of any large library.

Crain's Market Data Book and Directory. G. D. Crain, Jr., Chicago.

Industrial Arts Index. Subject index to a selected list of engineering, trade, and business periodicals.

Public Affairs Information Service. A clearing house of information on public affairs.

United States. Bureau of Efficiency. Report on the statistical work of the United States Government. 1922. 405 p. On page 359 there is a guide to original sources for the major statistical activities of the United States Government. This guide is arranged by subjects and indicates the Bureau which furnishes the statistical data.

United States. Committee on Ways and Means (House). Summary of tariff information, 1920. 1920. 1004 p.

United States. Documents Office. Checklist of United States public documents, 1789–1909.

United States. Documents Office. Monthly catalogue of United States public documents.

United States. Library of Congress. Bibliographies.

United States. Tariff Commission. Summary of tariff information, 1921, relative to the bill, H. R. 7456. 1922. 1625 p.

II. Bibliographies Relating to Food

Lyford, C. A. Bibliography of home economics. (United States Bureau of Education. Bulletin, 1919, No. 46.)

New York Nutrition Council. Bibliography Committee. Nutrition bibliography. . . . June, 1921. 30 p.

United States. Documents Office. Price list 11. Foods and cooking. List of publications for sale.

United States. Library of Congress. Division of Bibliography. List of references on food in relation to health. August 30, 1918.

III. Food Consumption

1. habits of food consumption

Quantitative Evidence

Bureau of Municipal Research, Philadelphia. Workingmen's standard of living in Philadelphia. Macmillan, 1919. 125 p.

Chapin, R. C. The standard of living among workingmen's families in New York City. (New York Charities Publication Committee, 1909. 372 p.)

Gephart, F. C. Analysis and cost of ready-to-serve foods. Chicago. (American Medical Association, 1915. 71 p.)

Great Britain. Board of Trade. Cost of living in American towns. 1909. (United States 62 Congress, 1st session. Senate Document 22.)

Harcourt, R. Food value of milk and its products. 1914. 20 p. (Ontario. Department of Agriculture. Bulletin 221.)

Kennedy, J. C. Wages and family budgets in the Chicago stockyards. University of Chicago Press, 1914. 80 p.

Lauck, W. J. Cost of living and the war. Doyle and Waltz Printing Company, Cleveland, 1918. 196 p.

Little, E. L., and W. J. H. Cotton. Budgets of families and individuals of Kensington, Philadelphia. Press of the New Era Printing Co., Lancaster, Pennsylvania. 1920. 273 p.

Meat production, imports, exports, and consumption. (United States Department of Agriculture. Monthly Crop Reporter. February, 1921. v. 7, p. 10.)

More, L. B. Wage earners' budgets. Holt, 1907. 280 p.

New York State. Department of Farms and Markets. Retail grocery stores: a study of certain problems of the retail grocer in New York City. 1922. 30 p.

Ogburn, W. F. A study of food costs in various cities. (United States Bureau of Labor Statistics. Monthly Labor Review. August, 1919. v. 9, p. 1–25.)

Pearl, Raymond. Food thrift. (American Academy of Political and Social Science. Annals. January, 1920. v. 87, p. 118–127.)

Pearl, Raymond. The nation's food. Saunders, 1920. 274 p.

Pearl, Raymond, and E. P. Matchett. Reference handbook of food statistics in relation to the war. Gov. Prtg. Off., Washington. 1918. 124 p. (U. S. Food Administration. Statistical Division.)

Phillips, V., and L. Howell. Racial and other differences in dietary customs. (Journal of Home Economics. September, 1920. v. 12, p. 396–411.)

Rochester (N. Y.) Public Safety Committee. Report of Rochester milk survey. December, 1919. 227 p.

Rubner, Max. Wandlungen in der Volksernährung. Leipzig: Akademische Verlagsgesellschaft m. b. H. 1913. 134 p.

Sherman, H. C., and L. H. Gillett. Adequacy and economy of some city dietaries. 1917. 32 p. (New York Association for Improving the Condition of the Poor. Publication No. 121.)

Streightoff, F. H. Report on the cost of living. (New York State. Factory Investigating Commission. Fourth report. 1915. v. 4, p. 1465–1844.)

United States. Bureau of the Census. Fourteenth census of the United States. 1920. v. 5. Agriculture. (p. 811–831. Vegetables.)

United States. Bureau of the Census. Fourteenth census of the United States. 1920. v. 10. Manufactures. 1919. (p. 62–82, "Canning and preserving.")

United States. Bureau of Foreign and Domestic Commerce. Statistical abstract of the United States, 1920. (p. 560. Estimated consumption of tea and coffee per capita.)

United States. Bureau of Labor Statistics. Bulletin 270. Retail prices, 1913–1919. 1921. 498 p.

United States. Bureau of Labor Statistics. Cost of Living in the District of Columbia. (Monthly Labor Review. September, 1918. v. 7, p. 112–114.)

United States. Bureau of Markets. Cows make two billion dollar industry. (The Market Reporter. June 19, 1920. v. 1. p. 385 f.)

United States. Department of Agriculture. Meat production, imports, exports, and consumption. (Monthly Crop Reporter. February, 1921. v. 7, p. 10.)

United States. Department of Labor. Annual report. 1903. p. 594–631. Consumption of food in 1,043 normal families.

United States. Federal Trade Commission. Food investigation. Report on the wholesale marketing of food. June 30, 1919. 268 p.

United States. Federal Trade Commission. Report on milk and milk products, 1914–1918. June 6, 1921. 234 p.

United States. Federal Trade Commission. Food investigation. Report on canned foods. May 15, 1918. 103 p.

United States. Food Administration. The day's food in war and peace 1918. 108 p.

United States. Food Administration. Statistical Division. Production of meat in the United States and its distribution during the war. 1919. 85 p.

Weld, L. D. H. Marketing survey of New Haven conducted for town and city improvement committee of the New Haven Chamber of Commerce. 1919. 52 p.

Women's Education and Industrial Union, Boston. Department of Research. The food of workingwomen in Boston. Boston, 1917. 213 p.

Descriptive Works

Davis, M. M. Food supply in families of limited means. Boston, 1917. 24 p. (League for Preventive Work, Boston. Publication No. 3.)

Kellogg, V. L., and A. E. Taylor. The food problem. Macmillan, 1917. 213 p.

Langworthy, C. F. Food customs and diet in American homes. 1911. 32 p. (United States. Office of Experiment Stations. Circular 110.)

Rose, M. S. Feeding the family. Macmillan, 1916. 449 p.

Rubner, Max. The nutrition of the people. (International Congress on Hygiene and Demography. XV. Washington, 1912. Transactions. v. 1, p. 385–407.)

Sherman, H. C. Food products. Macmillan, 1914. 594 p.

2. STANDARDS OF FOOD CONSUMPTION

Quantitative Evidence

Bureau of Applied Economics. Bulletin 7. Standards of living. Revised edition. 1920. 156 p.

Contains standards worked out by

Jaffa, M. E. p. 118–125.

Ogburn, W. F. p. 92–95.

United States. Bureau of Labor Statistics, p. 1–47.

Bureau of Municipal Research, Philadelphia. Workingmen's standard of living in Philadelphia. Macmillan, 1919. 125 p.

Gillett, L. H. A minimum food allowance and a basic food order. (Journal of Home Economics, July, 1920. v. 12, p. 319–324.)

Hunt, C. L. A week's food for an average family. 1921. 27 p. (United States Department of Agriculture. Farmers' Bulletin 1228).

Lauck, W. J. Cost of living and the war. Doyle and Waltz Printing Co., Cleveland, 1918. 196 p.

Contains standards worked out by

Canadian Department of Labor, p. 105–108.

New York City Board of Estimate, p. 142–151.

Rose, A. R. Abridged dietary calculations for rations in quantity. (Modern Hospital. June, 1920. v. 14, p. 487.)

Descriptive Works

Abel, M. H. Beans, peas, and other legumes as food. 1900. 32 p. (United States Department of Agriculture. Farmers' Bulletin 121.)

Abel, M. H. Care of food in the home. 1909. 46 p. (United States Department of Agriculture. Farmers' Bulletin 375.)

Abel, M. H. Successful family life on a moderate income. Lippincott, 1921. 251 p.

Donham, S. A. Spending the family income. Little, Brown, 1921. 174 p.

Gillett, L. H. Food primer for the home. N. Y. Bureau of Food Supply. 1918. 19 p.

Langworthy, E. F., and C. L. Hunt. Cheese and its economical uses in the diet. 1912. 40 p. (United States Department of Agriculture. Farmers' Bulletin 487.)

Meeker, R. What is the American standard of living? (United States Bureau of Labor Statistics. Monthly Labor Review. July, 1919. v. 9, p. 1–13.)

IV. Food Purchase and Use

Baldensperger, H. L. The garbage pail, a national thrift barometer. (American Academy of Political and Social Science. Annals. January, 1920. v. 87, p. 128–135.)

Bomberger, F. B. Marketing farm products in Maryland. 1920. 56 p. (Maryland. University. Extension Service. Bulletin 22.)

Brown, L. P. Food wastes — some causes and remedies. (Franklin Institute. Journal. May, 1918. v. 185, p. 585–610.)

Denton, M. C. Changes in food value of vegetables due to cooking. (Journal of Home Economics. April and May, 1919. v. 11, p. 143–154, 200–209.)

Differential between packaged foods and foods in bulk. (American Food Journal. November, 1917. v. 12, p. 606.)

Harvard University. Graduate school of business administration. Bureau of business research. Bulletin No. 18. Operating expenses in retail grocery stores in 1919.

Holmes, G. K. Consumers' fancies. (United States Department of Agriculture. Yearbook. 1904. p. 417–434.)

Langworthy, C. F. Food customs and diet in American homes. 1911. 32 p. (United States Office of Experiment Stations. Circular 110.)

Leeds, J. B. The household budget. Germantown, Philadelphia: J. B. Leeds, 1917. 246 p. (p. 41. "Amount of preserving done by 60 families.")

New Jersey. Department of Agriculture. Bulletin No. 7. Modern market methods. 1917.

New York State Bureau of Municipal Information. Report No. 229. 1917. Municipal public markets. (Conference of Mayors and Other City Officials of the State of New York.)

Ohio. State University, Columbus. Department of home economics. Relative cost of natural gas, soft coal, coal oil, gasoline, and electricity for cooking. 1917. 6 p.

Pearl, Raymond. Statistics of garbage collection and garbage grease recovery in American cities. (Journal of Industrial and Engineering Chemistry. November, 1918. v. 10, p. 927–930.)

Prices at public markets. (The Rural New Yorker. October 10, 1914. v. 73, p. 1215.)

Problem of disease. (Modern Medicine. July, 1920. v. 2, p. 525–528.)

Report of committee on retail distribution and marketing of foods. (American Journal of Public Health. April, 1922. v. 12, p. 290–293.)

Stecker, M. L. Some recent morbidity data: A summary of seven community sickness surveys made among policyholders of the Metropolitan Life Insurance Company, 1915–1917. 1919. 28 p.

United States. Bureau of the Census. Municipal markets in cities having a population of over 30,000. 1918. 1919. 56 p.

United States. Bureau of Labor Statistics. Bulletin 270. Retail Prices, 1913–1919. 1921. 498 p.

United States. Bureau of Labor Statistics. Bulletin 121. Sugar prices from refiner to consumer. 1913. 42 p.

United States. Bureau of Standards. Circular 70. Materials for the household. 1917. 259 p. (See p. 241–242.)

United States. Federal Trade Commission. Food investigation. Report on canned foods, May 15, 1918. 103 p. (See p. 32–36.)

United States Public Health Office. Sickness among office workers. (Public Health Reports. March 10, 1922. v. 37, p. 527–533.)

Van Arsdale, M. B., and Day Monroe. Food education and the community. (Teachers College Record. November, 1921. v. 22, p. 420–427.)

Weld, L. D. H. Marketing survey of New Haven conducted for town and city improvement committee of the New Haven Chamber of Commerce. 1917. 52 p.

Woodbury, M. Some home canning costs for 1919. (Journal of Home Economics. April, 1920. v. 12, p. 180–181.)

Wyer, S. S. Waste and correct use of natural gas in the home. 1920. 23 p. (United States Bureau of Mines. Technical paper, 257.)

V. Housing

1. Housing conditions

Quantitative Evidence

Aronovici, Carol. Housing conditions in New Britain, Connecticut, 1912. 43 p. (New Britain, Conn. Health Department.)

Aronovici, Carol. Housing conditions in the City of St. Paul. Report presented to the Housing Commission of the St. Paul Association. 1917. 120 p.

Attleboro, Massachusetts. Chamber of Commerce. Housing analysis of Attleboro, Massachusetts, 1921.

Bureau of Municipal Research, Philadelphia. Workingmen's standard of living in Philadelphia. Macmillan, 1919. 125 p.

Cincinnati Better Housing League. Report No. 1, 1918–19. 31 p.

Cleveland Chamber of Commerce. Committee on Housing and Sanitation. An investigation of housing conditions of war workers in Cleveland. 1918. 46 p.

Gebhart, John. Housing standards in Brooklyn. Tenement House Committee of the Brooklyn Bureau of Charities. 1918. 60 p.

Great Britain. Board of Trade. Cost of living in American towns. (United States 62d Congress, 1st session. Senate Document 22. 1909.)

Gries, J. M. Housing: broad economic aspects. (American Society of Civil Engineers. Proceedings. February, 1922. v. 48, p. 200–207.)

Ihlder, John. The houses of Providence. Snow and Farnham Company, Providence, Rhode Island. 1916. 96 p.

Lonergan, J. M. The housing situation in the City of New York. (New York City. Department of Health. Monthly Bulletin. February, 1921. v. 11, p. 25–36.)

McKenzie, R. D. The neighborhood: A study of local life in the City of Columbus, Ohio. (American Journal of Sociology, January, 1922. v. 27, p. 486–509.)

Magnusson, L. Housing by employers in the United States. (United States Bureau of Labor Statistics. Bulletin 263. 1920. 283 p.)

More, L. B. Wage-earners' budgets. Holt, 1907. 280 p.

Nolen, John. A good home for every wage earner. (American Civic Association. Pamphlets. Series 11, No. 9. 1917. 23 p.)

Ogburn, W. F. A study of rents in various cities. (United States Bureau of Labor Statistics. Monthly Labor Review. September, 1919. v. 9, p. 9–30.)

Olmstead, F. L. Lessons from housing developments of the United States Housing Corporation. (United States Bureau of Labor Statistics. Monthly Labor Review. May, 1919. v. 8, p. 27–38.)

Patric, Gladys. A study of the housing and social conditions in the Ann Street district of Los Angeles, California. (Society for the Study and Prevention of Tuberculosis. Los Angeles. 1919. 28 p.)

Real Estate Board of Baltimore, Maryland. A survey of housing conditions, 1921. 12 p.

United States. Bureau of Labor Statistics. Cost of living in the United States: housing, and fuel and light. (Monthly Labor Review. September, 1920. v. 11, p. 84–91.)

United States. Bureau of the Census. Fourteenth census of the United States, 1920. v. 2, p. 1279–1923. (Ownership of homes.)

United States. Bureau of Industrial Housing and Transportation. Report of the United States Housing Corporation. v. 1. Organization, policies, transactions. 1920. 391 p.

United States. Bureau of Labor Statistics. Bulletin 295. Building operations in representative cities. 1922. 49 p.
United States. Department of Labor. Economics of the construction industry, 1919. 263 p.
United States. 66th Congress, 3d session. Senate Report 829. 1921. Reconstruction and production. 61 p.
Ward, F. E. The farm woman's problem. 1920. 24 p. (United States Department of Agriculture. Department Circular 148.)
Weber, G. A. Housing and living conditions in the neglected sections of Richmond, Virginia. Whittet and Shepperson, Richmond, 1913. 80 p.

Descriptive Works

Aronovici, Carol. Housing and the housing problem. McClurg, 1920. 163 p.
Harrison, S. M. Social conditions in an American city. 1920. 439 p. (Russell Sage Foundation, New York. Department of surveys and exhibits. Publication No. 16.)
Housing betterment. January and April, 1922. v. 11, No. 1–2.
National Housing Association. Housing problems in America: proceedings of the eighth national conference on housing. 1920. 386 p.
Sherman, L. K. The government's housing experiment. (National Conference on Concrete House Construction. Proceedings. February, 1920. p. 96–98.)
Wood, E. E. The housing of the unskilled wage earner. Macmillan, 1919. 321 p.

2. HOUSING STANDARDS

Quantitative Evidence

Bureau of Applied Economics. Bulletin 7. Revised edition, 1920. Standards of living. 156 p.
Bureau of Municipal Research, Philadelphia. Workingmen's standard of living in Philadelphia. Macmillan, 1919. 125 p.
Massachusetts. Homestead Commission. Fourth annual report, 1916. 79 p.
National Industrial Conference Board. Research report No. 41. Family budgets of American wage-earners. 1921. 97 p.
Report of Committee on Farm Housing. (National Conference on Concrete House Construction. Proceedings. 1920. p. 55–66.)
Veiller, L. Industrial housing developments in America, Part 2. The government's standards for war housing. (Architectural Record. April, 1918. v. 43, p. 344–359.)

Descriptive Works

Barker, A. H. Domestic fuel consumption. Constable & Co., London, 1920. 159 p. (See p. 77. "Specification of air conditions in a room.")

Bell, Louis. The art of illumination. 2d edition. McGraw-Hill, 1912. 353 p.

Coöperative League of America. Report of the Committee on Coöperative Housing. Proceedings of the third congress of the Coöperative League of America. 1922. p. 103–110.

Peterson, Bernard. Organized labors' experiment in coöperative building. (Engineering and Contracting. January 26, 1921. v. 55, p. 85–86.)

Some results of the first year's work of the New York State Commission on Ventilation. (American Journal of Public Health. February, 1915. v. 5, p. 85–118.)

Weinberg, Louis. Color in everyday life. Moffatt, Yard, 1918. 343 p.

3. HOUSEHOLD MATERIALS

Quantitative Evidence

Analysis of costs of an imaginary composite building. (American Lumberman. June 4, 1921. p. 45.)

Ayres, L. P. The automobile industry and its future. Cleveland Trust Company, 1921. 32 p.

Bureau of Municipal Research of Philadelphia. Workingmen's standard of living in Philadelphia. Macmillan, 1919. 125 p. (See p. 79–82, "Cleaning supplies and services.")

Comparison of five different types of glue. (Chemical and Metallurgical Engineering, Jan. 26, 1921, v. 24, p. 165.)

Cornell, Sidney. Finish of metallic materials. (Chemical and Metallurgical Engineering, February 2, 1921. v. 24, p. 209–212.)

Crain's Market Data Book and Directory. G. D. Crain, Jr., 1922. Chicago.
Brick and clay products. p. 77.
Ceramics, glass. p. 93–94.
Furniture manufacturing. p. 193–194.
Lumber. p. 263–265.
Paper, paper products. p. 339–340.

Dickinson, H. C., and S. W. Sparrow. Possible fuel savings in automotive engines. (Society of Automotive Engineers. Journal. January, 1921. v. 8, p. 3–9.)

Fieldner, A. C., and others. Gasoline losses due to incomplete combustion in motor vehicles. (Journal of Industrial and Engineering Chemistry. January, 1921. v. 13, p. 51–58.)

Furniture terms suggested. (Furniture Manufacturer and Artisan. November, 1921. v. 83, p. 55 of advertising section.)

Gardner, H. A. Paint and varnish: their function, selection, and application. (Building Age. May, 1920. v. 42, p. 61–65.)

Gries, J. M. Housing: broad economic aspects. (American Society of Civil Engineers. Proceedings. February, 1922. v. 48, p. 200–207.)

Hardwoods used in furniture industry. (Furniture Manufacturer and Artisan. August, 1921. v. 83, p. 74.)

Jacobson, Lydia. Laundering. (Journal of Home Economics. March, 1922. v. 14, p. 109–113.)

Leather substitute products and markets. (Raw Material. September, 1919. v. 1, p. 322–327.)

MacLeod, S. J. House cleaning made easier. 1921. 31 p. (United States Department of Agriculture. Farmers' Bulletin 1180.)

Materials and equipment for use in housing operations. (American Architect. May 15, 1918. v. 113, p. 647–650.)

Minnick, Arthur. Prices of paints and varnishes. 1919. 25 p. (United States. War Industries Board. Price Bulletin 44.)

National Dry Goods Association. Bureau of Research and Information. Confidential report. Operation of phonograph departments in department stores.

Reflection factors of industrial paints. (Chemical and Metallurgical Engineering. September 28, 1921. v. 25, p. 590–591.)

Stewart, W. W. Prices of iron, steel, and their products. (United States War Industries Board. Price Bulletin 33. 1919. 45 p.)

Sullivan, E. C. Present status of American glassware. (Chemical and Metallurgical Engineering. January 7, 1920. v. 22, p. 509–530.)

Trigg, E. T. The paint and varnish making industry in Philadelphia. 1917. 29 p. (Philadelphia Chamber of Commerce. Educational Committee. Educational pamphlet No. 13.)

Trumbull, H. L. Prices of soaps and glycerin. (United States War Industries Board. Price Bulletin 49. 1919. 20 p.)

United States. Bureau of the Census. Fourteenth Census of the United States. v. 10. Manufactures. 1919.

United States. Bureau of Foreign and Domestic Commerce. Foreign commerce and navigation of the United States. 1919.

United States. Bureau of Industrial Housing and Transportation. Report of the United States Housing Corporation. v. 1. 1920. 391 p.

United States. Bureau of Labor Statistics. Bulletin 295. Building operations in representative cities. 1920. 49 p.

United States. Bureau of Labor Statistics. Cost of living in the United States: furniture and house furnishings. (Monthly Labor Review. January, 1920. v. 10, p. 27–34.)

United States. Bureau of Standards. Circular 70. Materials for the household. 1917. 259 p.

es. Bureau of Standards. Circular 107. The testing of paper. Frederick, 37 p.

Econ tates. Forest Service. Timber depletion, lumber prices, lumber Johnson orts. . . . June 1, 1920. 71 p.

d States. Forest Service. Forest Products Laboratory. Technical Jor notes No. F–2. 1919. The strength of commercial liquid glues.

nited States. Forest Service. Forest Products Laboratory. Technical n s No. 97. 1920. Tearing strength of paper.

United States. Tariff Commission. Tariff information series No. 8. The brush industry. 1918. 77 p.

United States. Tariff Commission. Tariff information series, No. 28. Hides and skins. 1922. 28 p.

United States. Tariff Commission. Tariff information surveys on the articles in paragraph 337 of the Tariff Act of 1913. Bristles and brushes. 1921. 57 p.

United States. Tariff Commission. Tariff information surveys on the articles in paragraph 359 of the Tariff act of 1913. Light leathers, group 1. Revised edition. 1922. 54 p.

United States. Tariff Commission. Tariff information surveys on the articles in paragraphs 65 and 66 of the Tariff Act of 1913. Soaps. 1921. 35 p.

Van Deman, Ruth. Household brushes. (Journal of Home Economics, June, 1922. v. 14, p. 278–281.)

Walker, P. H. Use of paint on the farm. 1911. 22 p. (United States Department of Agriculture. Farmers' Bulletin 474.)

Wiley, H. W., and C. H. Merriam. Durability and economy in papers for permanent records. 1909. 51 p. (United States Department of Agriculture. Report No. 89.)

Descriptive Works

Churchill, A. L., and L. Wickenden. The house-owner's book. Funk and Wagnalls, 1922. 388 p.

Clark, T. M. The care of a house. Macmillan, 1905. 283 p.

Hurst, G. H. Soaps. 3d revised edition. Scott, Greenwood, and Son, London. 1922. 432 p.

Lehman, M. A. The glassware department. Ronald Press, 1918. 161 p.

Lehman, M. A. The leather goods department. Ronald Press, 1917. 163 p.

Oilar, F. L. How to buy furniture for the home. Oilar Bros., Indianapolis. 1913. 179 p.

Simmons, W. H. Soap. London: Sir I. Pitman and Sons. 1917. 124 p.

United States. Bureau of Standards. Circular 70. Materials for the household. 1917. 259 p.

Vulté, H. T. Household chemistry. Easton, Pennsylvania.nd applica-
Publishing Company, 1917. 243 p.
Wheelright, W. B. Essential facts about paper. Privately printed Y of Civil
and Andrew, Inc., Boston. 1920. 38 p.

VI. Household Skills

1. present practice

Crain's Market Data Book and Directory. G. D. Crain, Jr., Chicago, 1922. (p. 345–347. Plumbing, heating, and ventilating.)
Gardner, H. A. Inspection of tests at Atlantic City. (Paint Manufacturers Association of the United States. Educational Bureau. Circular 97, June, 1920.)
Ihlder, John. The houses of Providence. Snow and Farnham, Providence, 1916. 96 p. (p. 28–29, "Number of gardens.")
Leeds, J. B. The household budget. J. B. Leeds, Germantown, Philadelphia. 1917. 246 p. See p. 75–76, 79–83.
Massachusetts. Homestead Commission. Fourth annual report, 1916. 79 p. (See p. 32–34, "Value of a garden.")
Merchants Association of New York. Industrial Bureau. Bulletin No. 2. The furniture industry, 1919. 66 p. (See p. 35–40, "Manufacturing costs.")
United States. Bureau of Labor Statistics. Cost of living in the United States — furniture and house furnishings. (Monthly Labor Review. January, 1920. v. 10, p. 27–34.)
Vanderwalker, F. N. Estimates, costs and profits, exterior painting and interior decorating. 2d edition. The Textbook Company, Chicago, 1916. 127 p.
Ward, F. E. The farm woman's problem. 1920. 24 p. (United States. Department of Agriculture. Department Circular 148.)
Wilson, G. M. A survey of the social and business usage of arithmetic. Teachers College, Columbia University, 1919. 62 p.
Woodward, G. A new idea as landlord and tenant. (National Housing Association. Proceedings. 1920. p. 173–182.)

2. standards of skill

Bruere, M. B., and R. W. Bruere. Increasing home efficiency. Macmillan, 1916. 318 p.
Churchill, A. L., and L. Wickenden. The house owner's book. Funk and Wagnalls, 1922. 388 p.
Cincinnati Model Homes Company. Report of Board of managers. 1920.
Clark, T. M. The care of a house. Macmillan, 1909. 283 p.
Collins, A. F. The home handy book. Appleton, 1917. 164 p.

Frederick, Christine. Household engineering. American School of Home Economics, Chicago, 1919. 527 p.

Johnson, C. S. Household repairs and renovations. Evans Brothers, London, 1920. 176 p.

Jones, B. E. Household repairs. Cassell and Company, London, 1917. 156 p.

MacLeod, S. J. House cleaning made easier. 1921. 31 p. (United States Department of Agriculture. Farmers' Bulletin 1180.)

MacLeod, S. J. The housekeeper's handbook of cleaning. Harper, 1915. 259 p.

Sabin, A. H. House painting. J. Wiley and Sons, 1918. 143 p.

United States. Bureau of Standards. Circular 75. Safety for the household. 1918. 127 p.

United States. Department of Agriculture. Farmers' Bulletin 818. The small vegetable garden. 1917. 44 p.

VII. Fuel Consumption

1. present practice

A B C's of comparative per capita uses of electricity in the United States. (The Journal of Electricity and Western Industry, June 15, 1921. v. 46, p. 95, editorial and frontispiece.)

Barker, A. H. Domestic fuel consumption. Constable, London, 1920. 159 p.

Bureau of Municipal Research, Philadelphia. Workingmen's standard of living in Philadelphia. Macmillan, 1919. 125 p.

Cost of fires by cause in the United States in 1917 and 1918. (Safeguarding America against Fire. January, 1920. v. 3, p. 4–5.)

Fuel conservation. (Steam. July, 1920. v. 26, p. 3–4.)

Gilbert, C. G., and J. E. Pogue. America's power resources. Century, 1921. 326 p.

Gilbert, C. G., and J. E. Pogue. The energy resources of the United States. 1919. 165 p. (United States National Museum. Bulletin 102. v. 1.)

Hughes, G. A. Electricity in household service. (General Electric Review. March, 1919. v. 22, p. 188–195.)

Ives, H. E. The Ives colorimeter in illuminating engineering. (Illuminating Engineering Society. Transactions. November, 1908. v. 3, 627–644.)

Kerosene demand varies little over United States. (National Petroleum News. Jan. 1, 1919. v. 11, p. 14.)

Leeds, J. B. The household budget. Germantown, Philadelphia: J. B. Leeds, 1917. 246 p.

McBride, R. S., and C. E. Reinicker. Gas mantle lighting conditions in ten large cities. 1917. 37 p. (United States Bureau of Standards, Technologic Paper 99.)

McKenzie, R. D. The neighborhood: A study of local life in the City of Columbus, Ohio. (American Journal of Sociology. January, 1922. v. 27, p. 486–509.)

McVey, F. L. The nation's call for thrift. (American Academy of Political and Social Science. Annals. January, 1920. v. 87, p. 27–31.)

Martin, T. C. Review of electrical business in 1920. (Electrical World. February 5, 1921. v. 77, p. 304.)

Owen, Ernest. Energy resources of the world and their utilization. (Chemical Age. New York. July, 1921. v. 29, p. 284–289.)

Pierson, A. H. Consumption of firewood in the United States. 1910. 7 p. (United States Forest Service. Circular 181.)

Pogue, J. E. The economics of petroleum. Wiley and Sons, 1921. 375 p. (p. 136, "Consumption of kerosene.")

Polakov, W. N. Oil. (New Republic. June 14, 1922. v. 31, p. 68–70.)

Poole, Herman. Calorific power of fuels. J. Wiley and Sons, 1918. 267 p.

Status of manufactured fuel gas. (Chemical and Metallurgical Engineering. October 6, 1920. v. 23, p. 695.)

United States. Bureau of Foreign and Domestic Commerce. Statistical Abstract. 1920. (p. 563, "Firewood used on farms.")

United States. Bureau of Labor Statistics. Cost of living in the United States: housing, and fuel and light. (Monthly Labor Review. September, 1920. v. 11, p. 83–99.)

United States. Bureau of Standards. Circular 55. Measurements for the household. 1915. 149 p.

United States. Bureau of Standards. Circular 75. Safety for the household. 1918. 127 p.

United States. Fuel Administration. The fuel situation at the beginning of winter, 1918–1919. October 26, 1918. 8 p.

United States. Public Health Service. Public Health Bulletin No. 71. 1915. 224 p. (p. 133, "The use of reflectors in New York garment shops.")

Ward, F. E. The farm woman's problems. (United States Department of Agriculture. Department Circular 148.)

Wyer, S. S. Relative cost of fuel used for cooking. (Gas Age. July 16, 1917. v. 40, p. 69–70.)

Wyer, S. S. Waste and correct use of natural gas in the home. 1920. 23 p. (United States Mines Bureau. Technical Paper 257.)

2. STANDARDS OF FUEL CONSUMPTION

Daniels, A. M. Operating a home heating plant. 1921. 28 p. (United States Department of Agriculture. Farmers' Bulletin 1194.)

Steele, B. L. Fuel economy in domestic heating and cooking. 1917. 13 p. (Washington State College, Pullman. Extension Service. Bulletin 32.)

Tennessee. University of Tennessee. Economical firing of Tennessee coals for house heating. 1918. 16 p. (University of Tennessee Record. v. 20, No. 5.)

United States. Fuel Administration. Fuel facts. 2d edition. October, 1918. 64 p.

VIII. Clothing Consumption

1. habits of consumption

Quantitative Evidence

Artificial silk production doubled in 1921. (Textile World Journal. February 4, 1922. v. 61, p. 661.)

Chapin, R. C. Standard of living among workingmen's families in New York City. Charities Publication Committee, New York, 1909. 372 p. (p. 162–181, "Clothing.")

Hausman, L. A. The microscopic identification of commercial fur hairs. (Scientific Monthly. January, 1920. v. 10, p. 70–78.)

Laut, A. C. The fur trade of America. Macmillan, 1921. 341 p. (p. 34–35, "The relative durability of furs.")

Miller, Ellen. A hosiery guide for the shopper. (Journal of Home Economics, August, 1921. v. 13, 368–369.)

More, L. B. Wage-earners' budgets. Holt, 1907. 280 p.

National Bureau of Economic Research. Income in the United States. National Bureau of Economic Research, New York. 1922. 2 v. (v. 2, p. 17–30.)

National Industrial Conference Board. Family budgets of American wage-earners. 1921. 97 p. (Research Report No. 41.)

Table 2 contains studies of actual clothing expenditures made by
United States Bureau of Labor Statistics, 1916.
Philadelphia Bureau of Municipal Research, 1916–1918.

Northwestern University. School of Commerce. Bureau of Business Research. Costs, merchandising practices, advertising, and sales in the retail distribution of clothing. Prentice-Hall, New York. 1921. (v. 1, Sales and sales ratios in retail clothing stores, 1919, 1918, and 1914.)

Palmer, E. G. A survey of the garment trades in San Francisco, 1921. 87 p. (California. University. Education Department. Research in Education Bureau. Study No. 3.)

Phelps, E. L. Further data on purchasing habits. (Journal of Home Economics. December, 1921. v. 13, p. 600–603.)

Phelps, E. L. A study of clothing purchasing habits. (Journal of Home Economics. November, 1920. v. 12, p. 491–495.)

Principal materials used in wool manufactures: 1919, 1914, and 1909. (National Association of Wool Manufacturers. Bulletin. October, 1922. v. 52, p. 438.)

Progress report on the petticoat test. (Journal of Home Economics. January, 1922. v. 14, p. 20–23.)

United States. Bureau of the Census. Fourteenth census of the United States. v. 10. Manufactures, 1919.
Cotton manufactures. p. 157–189.
Fur-felt hats. p. 285–290.
Knit goods. p. 190–215.
Silk manufactures. p. 216–232.
Wool manufactures. p. 233–267.
Wool-felt hats. p. 262.

United States. Bureau of Foreign and Domestic Commerce, Miscellaneous.
Series No. 29. The women's muslin-underwear industry. 1915. 184 p.
Series No. 31. The hosiery industry. 1915. 258 p.
Series No. 32. Knit-underwear industry. 1915. 217 p.
Series No. 34. Men's factory-made clothing. 1916. 300 p.
Series No. 36. The shirt and collar industries. 1916. 178 p.

United States. Bureau of Labor Statistics. Cost of living in the District of Columbia: summary of family expenditures. (Monthly Labor Review. November, 1917. v. 5, p. 1–12.)

United States. Bureau of Labor Statistics. Cost of living in the United States. (Monthly Labor Review. August, 1919. v. 9, p. 117–119.)

United States. Bureau of Labor Statistics. Cost of living in the United States: furniture and house furnishings. (Monthly Labor Review. January, 1920. v. 10, p. 27–34.)

United States. Bureau of Labor Statistics. Quantity and cost of clothing purchased by average workingman's family in one year. (Monthly Labor Review. September, 1922. v. 15, p. 49–65.)

United States. Committee on Finance. 63d Congress, 1st Session. Tariff schedules. 1913. 3 vol. (v. 3, p. 1590, "Furs.")

United States. Committee on Interstate Commerce. 67th Congress, 1st Session. Hearings on S. 799, "Truth in fabric." 1921. 507 p.

United States. Federal Trade Commission. Report on leather and shoe industries. August 21, 1919. 180 p.

United States. Federal Trade Commission. Report on shoe and leather costs and prices. June 10, 1921. 212 p.

United States. Railroad wage commission. Report to the director general of railroads, 1918. 156 p. (p. 93, "Comparative cost of living in 1915 and 1917.")

United States. Tariff Board. Wool and manufactures of wool. 4 v. 1912. (v. 1, p. 18–19, "Ready-made clothing.")

United States. Tariff Commission. Tariff information surveys on: Articles in paragraph 252. Countable cotton cloths. 1921. 162 p.

Articles in paragraphs 255–256. Cotton wearing apparel. Revised edition, 1923. 37 p.
Articles in paragraphs 259, 260, and 261. Cotton knit goods. Revised edition, 1923. 74 p.
Articles in paragraph 264. Household articles of cotton. Revised edition, 1922. 16 p.
Articles in paragraph 288 (in part). Wool knit goods. Revised edition, 1923. 38 p.
Articles in paragraphs 334–335. Straw hats. Revised edition, 1921. 50 p.
Articles in paragraph 348. Furs and fur goods. Rev. edition, 1921. 43 p.
Articles in paragraphs 354, 356, and 357. Fur hats, bonnets, or hoods. Revised edition, 1921. 29 p.

United States. Tariff Commission. The wool-growing industry. 1921. 592 p.

Value of shoddy. (Textile World. September 4, 1920. v. 58, p. 1559.)

2. STANDARDS OF CONSUMPTION

Quantitative Evidence

Bureau of Applied Economics. Standards of living. Revised edition, 1920. 156 p. (Bulletin 7.)

Bureau of Municipal Research, Philadelphia. Workingmen's standard of living in Philadelphia. Macmillan, 1919. 125 p.

Great Britain. Board of Trade. Cost of living in American towns. 1909. (U. S. 62 Congress, 1st session. Senate Document 22.)

Lauck, W. J. Cost of living and the war. The Doyle and Waltz Printing Company, Cleveland, 1918. 196 p. (p. 120–124, "Budget awarded to Seattle and Tacoma, Washington, street railway employees.")

National Industrial Conference Board. The cost of living among wage-earners, Fall River, Massachusetts, October, 1919. 1919. 18 p. (Research Report No. 22.)

National Industrial Conference Board. Family budgets of American wage-earners. 1921. 97 p. (Research Report No. 41.)
Table 3 contains standards worked out by
United States. Bureau of Labor Statistics. August, 1919.
Labor Bureau, Inc. November, 1920.

3. DESCRIPTIVE WORKS ON HABITS AND STANDARDS OF CONSUMPTION

Aiken, C. R. The millinery department. Ronald Press, 1918. 175 p.

Baldt, L. I. Clothing for women. Lippincott, 1916. 454 p.

Beaumont, Roberts. Wool substitutes. Sir I. Pitman and Sons, London, 1922. 190 p.

B. F. Goodrich Company, Akron, Ohio. A wonder book of rubber. 1917. 72 p.

Bray, John. All about dress. T. W. Laurie, London, 1913. 291 p.

Caton, Florence. The hygiene of women's underwear. (Journal of Home Economics. June, 1921. v. 13, p. 252–255.)

Cherington, P. T. The wool industry. A. W. Shaw Company, Chicago, 1916. 261 p.

Chittick, James. Silk manufacturing and its problems. J. Chittick, New York, 1913. 432 p.

Dannerth, Frederick. The manufacture of rubberized and rubber-coated fabrics. (Color Trade Journal. January, 1921. v. 8, p. 23–27.)

Davis, William. Hosiery manufacture. Sir Isaac Pitman & Sons, London, 1920. 136 p.

Denny, G. G. Fabrics and how to know them. Lippincott, 1923. 146 p.

Dyer, Elizabeth. Merchandise manual for shoe departments. 1921. 133 p. (The Carnegie Institute of Technology, Pittsburgh, Pennsylvania. Research Bureau for Retail Training. General Series No. 1.)

Dyer, Elizabeth. Textile fabrics. Houghton Mifflin, 1923. 352 p.

Field, C. C. Retail buying. Harper, 1917. 219 p.

Geer, W. C. The reign of rubber. Century, 1922. 344 p.

Harding, A. R. Fur buyer's guide. A. R. Harding. St. Louis, Missouri, 1915. 366 p.

Harmuth, Louis. Dictionary of textiles. Fairchild Publishing Company, New York, 1920. 222 p.

Hutchinson, E. L. The house furnishings department. Ronald Press, 1918. 229 p.

Kennard, B. E., and E. L. Hutchinson. The jewelry department. Ronald Press, 1917. 163 p.

Lehmann, M. A. The glassware department. Ronald Press, 1918. 161 p.

Lehmann, M. A. The leather goods department. Ronald Press, 1917. 163 p.

Lehmann, M. A. The stationery department. Ronald Press, 1917. 117 p.

Nystrom, Paul. Textiles. Appleton, 1920. 335 p.

Parsons, F. A. The psychology of dress. Doubleday, 1920. 358 p.

Report on underwear labeling. (Textile World. October 25, 1919. v. 56, p. 2549.)

Retail shoe salesmen's institute. Materials in shoes. (Training course for retail shoe salesmen, v. 3.)

Sheeting production and sales. (American Wool and Cotton Reporter. February 10, 1921. v. 35, p. 523.)

Smith, W. K. Can the American manufacturer force styles? (Printers' Ink. October 12, 1922. v. 121, p. 10–12.)

Souder, M. A. The notion department. Ronald Press, 1917. 100 p.

Thompson, E. B. The cotton and linen departments. Ronald Press, 1917. 182 p.

Thompson, E. B. The silk department. Ronald Press, 1918. 224 p.

Titsworth, E. B. Hints on choosing textiles, 1913. (New York State. College of Agriculture at Cornell. The Cornell reading-courses. v. 2, No. 45.

Turner, Annabelle. Study of fabrics. Appleton, 1918. 206 p.

United States. Federal Board for Vocational Education. Bulletin 23. Clothing for the family. 1919. 116 p.

United States. Federal Trade Commission. Report on combed cotton yarns. April 14, 1921. 94 p.

United States. Tariff Commission. Tariff Information Surveys on:

Articles in paragraph 264. Household articles of cotton. Revised edition. 1922. 16 p.

Articles in paragraphs 311–314. Silk, silk yarns and threads, and silk pile fabrics. 1921. 124 p.

Articles in paragraphs 315, 316, and 317. Silk wearing apparel and silk small wares. Revised edition, 1922. 58 p.

Use of cotton as a wool substitute. (Textile World. January 12, 1918. v. 53, p. 3101.

Veblen, Thorstein. The theory of the leisure class. Huebsch, 1918. 404 p. (p. 167–187, "Dress as an expression of pecuniary culture.")

Warburg, J. P. Wool and wool manufacture. The First National Bank of Boston, 1920. 50 p.

Weinberg, Louis. Color in everyday life. Moffat, Yard, 1918. 343 p. (p. 70–102, "Color in dress.")

Woolman, M. S. Clothing; choice, care, cost. Lippincott, 1920. 289 p.

INDEX

Accident prevention, 183–84, 213–15
Accounts. *See* Arithmetic
Adhesive materials, 151–52
Adulteration. *See* Trade practices
Advertising, of furniture, 124–25; of phonographs, 155
American dwelling, 77–79, 115
Apartments. *See* Tenements
Apples, 59
Arithmetic, in relation to: clothing, 284; food, 68–72; fuels, 220–22; household, 185–93, 320–24
Automobiles, 157–59

Bibliography, 335–53; of clothing, 349–53; of descriptive works, 338–39, 342, 345–46, 351–53; of food, 335–40; of fuels, 347–49; of general indexes and bibliographies, 335; of habits of consumption, 336–38, 340–42, 346, 347–48, 349–51; of household materials, 343–46; of household skills, 346–47; of housing, 340–43; of quantitative evidence, 336–37, 338, 340–42, 342–43, 343–45, 351; of standards of consumption, 338–39, 342–43, 346–47, 348–49, 351–53
Blankets, 279
Brass, 136
Bread, 59
Bronze, 136
Brooms, 154
Brushes, 152–53, 169
Budget, cleansing materials in, 145; clothing in, 230, 234–38; food in, 24; furniture in, 145; gardening in, 181; health in, 145; rent in, 80, 102, 106
Building and Loan Associations, 89, 92
Building construction, 109, 164–65; cost of labor in, 114; vocabulary of, 118
Building guilds, 93
Building material, 114–22, 167; brick as, 118; cement as, 118; glass as, 118; relative cost of, 116
Butter, 28, 30

Calculation. *See* Arithmetic
Canned food, 30, 38, 53; milk as, 30; vegetables as, 38
Carpentry, 163, 164, 169
Cement, 151
Cereals, 19, 42–44, 62
Cheese, 30, 47, 63. *See also* Dairy products
Cleansing preparations, 145–51
Clothing, beauty in, 241; chief fabrics for, 243–59; construction and care of, 281–83; consumption of, 223–85; cotton in, 245–46; durability of, 228–29; expenditures for, 234–38; fur, 257–59; hats, 272–74; hosiery, 269–71; hygiene of, 239–40; laundering of, 240–41; linen in, 254–57; men's, 276; misbranding, 245; qualitative standards of, 238; rubber in, 259; shoes, 265–69; silk in, 251–54; social significance of, 224–25; underwear, 274–76; women's, 261–63; wool in, 247–51
Coal, 73, 195, 200, 221. *See also* Fuel consumption
Cold storage products, 59
Concreting, 174–75
Conservation, of clothing, 223–24; of food, 66, 72; of fuel, 199–201; of labor, 163

Consumption statistics, in relation to: automobiles, 157; building materials, 119; butter, 30; chief nutrients, 27; clothing, 229; firewood, 195; fish, 35; food commodities, 22, 24, 25, 46; fruits, 42; fuels, 195–99; furniture woods, 127; grains, 44; household articles, 112–13; lumber, 116; meat, 32–33; men's clothing, 263; men's suits, 264; milk, 29–31; paint and varnish, 130; petroleum, 200; phonographs, 154; soap, 148; textile furnishings, 278; vegetables, 39; women's clothing, 262
Containers. *See* Packages
Cooking equipment, efficiency in, 209–10
Coöperative movement, in food purchase, 57–58; in housing, 92–94
Copper, 136
Cost of commodities. *See* Cost of living
Cost of living, automobiles in, 158; bread in, 53; brick and clay products in, 119; building construction in, 164–65; canned goods in, 53; carpets and rugs in, 143; clothing in, 225; eggs in, 55; food in, 35, 45–49; foods in bulk in, 52; fuel in, 73, 208–11; furniture in, 171; grains in, 44; heating in, 208–11; homes in, 84, 103, 114; household labor in, 173; illuminants in, 205; meat in, 34; milk in, 52; onions in, 55; painting in, 174; potatoes in, 55; sugar in, 53; vegetables in, 39
Cotton, 245–46; hosiery, 270
Curriculum, 1–17; defects of subject matter organization in, 286; for economic consumption, 286–334; factors conditioning, 1; language in, 287; -making, 3–4, 157

Dairy products, 19, 28–32
Decorative skills, 179–80
Defects in habits of living. *See* Habits of living, defects
Diet. *See* Food
Disinfectants, 150
Dwelling, American, 77–79, 115. *See* Housing

Educational objectives, 4, 10–11; list of: adhesives, 152; American dwelling, 79; arranged by subjects, 286–334; automobiles, 159; brushes and brooms, 154; building materials, 121–22; buying in large quantities, 51; buying package foods, 54; superstitions, 60; care of a house, 176–77; carpentry skills, 172–73; cash or credit purchasing, 56; cereals, 43–44; chief foods of the nation, 19; cleaning skills, 179; cleansing and polishing preparations, 150–51; clothing calculation and measurement, 285; clothing in the budget, 238; cocoa, 45; coffee 45; consumption of shoes, 269; construction and care of clothing, 283; cost of food, 49; cost of fuels, 211–12; cotton goods, 246; dairy products, 31–32; decorative skills, 180; electrical materials, 213; energy requirements, 26; floor coverings, 145; food for the sick, 66; food measurement and calculation, 71–72; food waste, 68; fruits, 41; fuel measurement and calculation, 222; fuel problem, 201; fuels, 199; fuel skills, 218–19; furniture, 128–29; gardening skills, 181–82; hats, 273–74; heating, 207; home ownership, 94–95; hosiery, 271–72; household measurement and calculation, 192–93; housing conditions and standards, 83; leather goods, 142; lighting, 205–6; linen in clothing, 256–57; marketing plans, 58–59; meat, 35–36; men's clothing, 265; men's shirts and furnishings, 277; metal products, 137; miscellaneous food skills, 76; miscellaneous household skills, 183; overcrowding, 100–1;

paint and varnish, 134–35; paper products, 140; phonographs, 156; preparation of food, 64; qualitative standards of clothing, 242–43; quantitative study of the clothing of the people, 234; rent, 107; requirement of proteins and mineral salts, 28; rubberized fabrics, 260; safety in the household, 184; safety in the use of fuels, 215; selection of food by expenditures, 23; selection of food by weight, 21; silk in clothing, 254; social significance of clothing, 228; storing and preserving food, 61–62; tea, 45; tenements, 97; textile furnishings, 281; underwear, 275–76; use of fuel in cooking, 74; vegetables, 39–40; ventilation, 109; wool in clothing, 251
Electrical materials, 212–13
Electricity, 73, 196, 210–11, 221–22. *See also* Fuel consumption

Fashions, 225–28; economic effect of, 227; in floor coverings, 142–45; in hats, 273; how set, 226; in men's clothing, 265; in shoes, 268; in underwear, 275
Food, chief articles of, 18–19; consumption, 18–76; its place in economic life, 18; meat as, 33; preparation of, 62–64; selection, 19–28; for the sick, 65–66; storage of, 60–61; waste, 66–68
Food purchase, cash or credit in, 55; coöperative movement in, 57–58; in large quantities, 50–51; marketing plans for, 56–59; in packages, 51–54; seasonal changes in, 55; superstitions in, 59. *See also* Marketing
Food value, of cereals, 42–43; of cheese, 31; of cocoa, 44; of coffee, 44; of fish, 35; of fruit, 42; of meat, 34; of tea, 44; of vegetables, 36–38
Fractions. *See* Arithmetic
Fruit, 40–42, 53, 61, 67
Fuel, chief kinds of, 195–99; comparative importance of, 197; consumption, 194–222; for cooking, 72–74; problem, 199–201; skills, 215–19; waste of, 72–73
Fur, 257–59; kinds of, 258; production of, 258
Furniture, 122–29, 167, 172; advertising of, 124–25; and income, 128; misbranding, 124; quality in, 125–29; repair of, 152; woods for, 122–25

Gardening, 180–82
Gas, 73, 195, 200–201, 221. *See also* Fuel consumption
Gasoline, 159
Glass, 120, 169
Glazing, 175
Glue, 151, 166
Government housing, 90
Grains. *See* Cereals
Grease, recovery of, 66; solvents, 150

Habits of living, defects, 27, 29, 32, 33, 37, 40, 43, 45–49, 63, 72, 115, 126–28, 158, 160–61, 167, 199–201, 203–4, 216, 231–38, 269. *See also* Surveys
Handkerchiefs, 277–78
Hardware, 135–37
Hats, 272–74; raw materials of, 272–73
Health, 168, 331–34
Heating, 206–7
Home ownership, 83–95; and building tendencies, 88; and government aid, 84–85, 90; and income, 86; and labor mobility, 89; and living conditions, 86–89; promotion of, 89–95
Home, safety in the, 183–84, 213–15; typical, 115
Homes, rented, 83. *See* Housing
Hosiery, 269–72; raw materials of, 270

House cleaning, 177–79
Household arts, 287–303
Household materials, 75, 111–59; listed, 112–13
Household safety, 334
Household skills, carpentry, 171–73; concreting, 174–75; decoration, 179; gardening, 180–82; glazing, 175; house cleaning, 177–79; painting, 173–74; plastering, 174–75; plumbing, 175–76; varnishing, 173–74
Housing, 77–110; and finance companies, 92; government, 90; industrial, 91; shortage in, 109–10

Illumination. *See* Lighting
Industrial Arts, 304–14
Industrial housing, 91

Kerosene, 196. *See also* Fuel consumption
King, W. I., 7
Kitchen utensils, 75

Language study, 287
Laundering, 240–41
Leather, in bags, 140–42; imitation, 141–42; in shoes, 266–68; in upholstery, 140–41
Legumes, 47, 62
Lighting, 201–6; apparatus for, 203–4; color of walls in, 204; cost of, 205; effect of color on, 133; materials of illumination for, 202–3
Lime, 120
Linen, 254–57; table, 280
Linoleum, 144–45
Lumber, 116–18, 185; durability, 116; quantity consumed, 116; special uses of, 117

Machines, washing, 283
Marketing, 50–60, 70. *See also* Purchase
Markets, municipal, 56; prices in, 57
Materials, adhesive, 151–52; electrical, 212–13. *See* Household materials
Measurement. *See* Arithmetic
Measures, weights and. *See* Arithmetic
Meat, 19, 59; substitutes for, 34–35
Men's clothing, 263–65
Men's shirts, 276
Metal, polishes, 149; products, 135–37
Milk, 28–32, 47, 67
Misbranding, furniture, 124; legislation in relation to, 245; linen, 255; silk, 253; underwear, 275; wool, 247–48
Mucilage, 151

Nutrition. *See* Food

Ogburn, W. F., 20, 25, 27, 98, 99, 101, 103, 108
Oilcloth, 144–45
Overcrowding, 87, 98–101

Package goods, 51–54; cost of, 51–54; foods as, 62
Packages, legal sizes of, 54
Paint, 129–35; choice of, 131; colored pigments in, 131; ingredients of, 130; and lighting, 133; ready-mixed, 132, 174
Painting, 164, 169, 173–74
Paper, durability of, 139; products, 137–40; writing, 138–39
Paste, 151
Pearl, Raymond, 5, 27, 66
Phonographs, 154–57, 169
Pigments, reflection value of, 133–34
Plastering, 174–75
Plumbing, 175–76
Polishing preparations, 145–51
Prepared food, 62
Prices. *See* Cost of living
Purchase, of automobiles, 158; of furniture, 125; of lumber, 117; of phonographs, 156. *See also* Marketing

Raincoats, 259
Reflectors, 204
Rent, 98, 99, 100, 101–7, 191; and the budget, 106; fair, 103–5; and income, 101–3; items of, 104; and taxes, 105
Rented homes, 83
Repairs, of clothing, 282; of furniture, 172; in household, 115
Rubber, 259
Rugs, 169; kinds of, 143–44; wool-fiber, 144

Safety, in the home, 183–84, 213–15; household, 334
Shades, 204
Sheets, 279
Shelter. *See* Housing
Shoddy, 241–51
Shoes, 265
Silk, 251–54; hosiery, 270–71; raw materials of, 252
Skills, clothing, 281–83; food, 74; fuel, 215–19; household, 161–93
Soap, 145–48, 169; raw materials of, 146–47
Standard of living: caloric consumption of foods, 23; chief nutrients, 27; cleansing and polishing preparations, 145; clothing, 231–38; consumption of facts, 26–27; consumption of mineral salts, 26–27; consumption of proteins, 26–27; data on, 8–9; food consumption by weight, 22–23; furniture woods, 126–27; housing, 78, 81–83, 98; men's clothing, 263–64; milk, 28; rent, 102, 106
Storage of food, 60–61
Sugar, 47
Suits, men's, 264
Surveys, in relation to: automobiles, 157–58; building operations, 83–84; butter, 30; caloric consumption of foods, 23; causes of fire, 214; cereals, 43; chief nutrients, 27; clothing, 228–30, 231–38; cocoa, 45; coffee, 45; construction of clothing, 281–82; consumption of fats, 26–27; consumption of mineral salts, 26–27; consumption of proteins, 26–27; fish, 35; foods, 45–49; food storage, 61; fruits, 40; fuels, 195–99; furniture, 122–25, 125–28; garbage disposal, 67; gardening, 180; gas mantles, 203–4; heating, 216–17; home ownership, 83; homes, 77; household labor, 178; household skills, 162–64, 170; houses, 115; housing, 78, 79–80, 85–89, 95–97, 98–100; industrial housing, 91; lighting, 107–8; meat, 32–36; men's clothing, 263–65; milk, 29–31; phonographs, 155; plumbing, 176; rent, 101–3; sickness, 65; tea, 45; textile furnishings, 278; usage of arithmetic, 68; vegetables, 36–40; women's clothing, 261–62

Table linen, 280
Talking machines. *See* Phonographs
Tenements, 77, 83, 87, 95–98
Textile furnishings, 277–81
Textiles. *See* Clothing, chief fabrics
Tools, 135–36, 169
Towels, 280
Trade practices, 252–53; in relation to: fur, 258–59; furniture, 124–25; leather, 140, 141; linen, 255; linoleum, 145; metal products, 136; paper, 140; ready-mixed paints, 132; silk, 250; soap, 148; underwear, 275

Underwear, raw materials for, 274–76
Utensils, kitchen, 75

Varnish, 129–35
Varnishing, 173–74
Vegetables, 19, 36–40, 53, 61, 63, 67
Ventilation, 107–19

Washing machines, 283
Waste. *See* Habits of consumption, defects

Weights and measures. *See* Arithmetic
Wheat, 46. *See also* Grains
Wilson, G. M., 11, 12, 68, 184, 185, 221
Window shades, 280
Women's clothing, 261–63
Wood, 73, 195. *See also* Fuel consumption
Wool, 247–51; hosiery, 271; raw materials, 248
Worsted, 249

7085

Matt

DATE DUE

~~APR 13 1993~~	~~FEB 2[illegible] 1994~~

FLORIDA STATE UNIVERSITY
3 1254 00667 3483
LUIS
WITHDRAWN F.S.U.